# UTILITY POULTRY KEEPING

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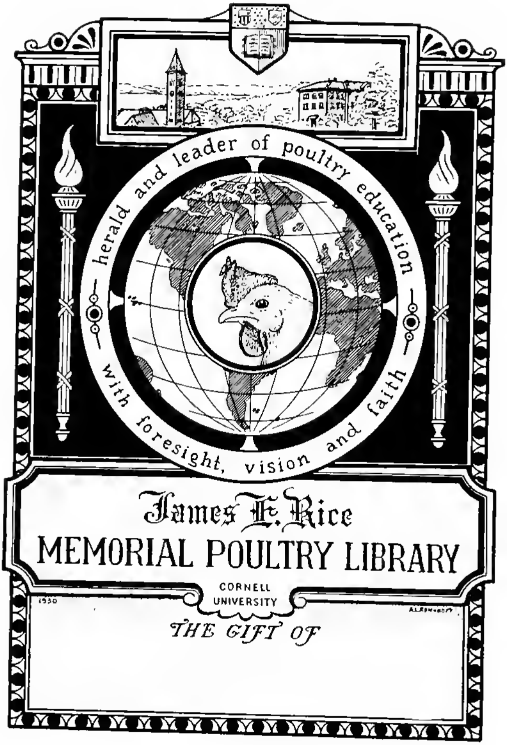
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# UTILITY POULTRY-KEEPING

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BY

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CONTRIBUTOR TO "THE POULTRY WORLD," "POULTRY," "AGRICULTURAL GAZETTE," ETC.

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# PREFACE

As its title denotes, this book is primarily intended for utility poultry-keepers, whether they look upon their fowls as a means of livelihood, or as a pleasant hobby only. I cannot lay claim to any special knowledge of exhibition poultry, and I have therefore made no attempt to deal with them other than to indicate such sane methods of culture as apply to all classes of stock. Indeed, there are so many standard works dealing either entirely or in part with "The Fancy," that any further matter seems superfluous. But I am hoping that this little work, unpretentious though it is, may be of some practical use to those who, like myself, believe that the possibilities of utility poultry-keeping in Great Britain are almost without limits. I have tried to steer clear of technicalities, so that the beginner may not be discouraged, and also, wherever possible, to give definite figures and methods of successful operations.

I should like to make it clear, in regard to the position I have taken up with reference to "in-breeding" in Chapter I. and elsewhere in the book, that my strictures apply to the indiscriminate mating which is only too generally allowed in poultry on farms throughout the country, sternly as it would be repressed in the case of other stock.

I fully realize the value of "line-breeding" for special purposes, and it may be necessary for the fancier to use even full brothers and sisters in the breeding-pens in the production of a new variety or colour, but the fancier who attempts these things is usually an experienced man, knowing the dangers and capable of guarding against them, whilst if he slightly lowers the productiveness of his hens the matter is not of the same importance to him as to the utilitarian.

My use of the term "in-breeding" applies, therefore, to all those cases where the proportions of blood are unknown or but vaguely guessed at, and *not* to scientific mating of related stock. A glance at Appendix A, where the Felch's breeding chart is illustrated, will show my meaning better than further explanation.

Presumably, one could go on breeding for all time if the system were properly carried out.

Nevertheless, I still believe that ninety-nine out of a hundred poultry-keepers are on the safer side if they maintain the principle of "selected fresh blood" every year, and where a strain of first-class layers is to be evolved, "in-breeding" must be absolutely "taboo," and "line-breeding" carried on only when the principles which underlie it are thoroughly grasped.

I should like to thank the Utility Poultry Club for allowing me to include the "Monthly Notes"; the Editor of the *Agricultural Gazette* for allowing me to reprint articles published therein; and the Editor of the *Poultry World*, 154, Fleet Street, E.C., for permission to do the same, and for his kindness in allowing the reproduction of the Breeding Chart; the National Poultry Organization Society for supplying figures relative to the cost of equipment of poultry depots; all the firms who have lent blocks for illustrative purposes; and, last but not least, my relative, Mr. Leonard Crawshaw, for his invaluable help in the correction of the proofs and for his admirable comments and suggestions.

ELLEN C. DAVIES.

# TABLE OF CONTENTS

CHAPTER PAGE

I. CHOICE AND GENERAL MANAGEMENT OF THE STOCK BIRDS 1

II. INCUBATION - - - - 36

III. REARING - - 59

IV. TABLE POULTRY - - - - - 87

V. DISEASES OF POULTRY 113

VI. BACKYARD AND SUBURBAN POULTRY-KEEPING - 136

VII. POULTRY-FARMING - - - - 156

VIII. THE PLACE OF POULTRY ON THE FARM 185

IX. COMMERCIAL MARKETING AND ORGANIZATION 204

X. INTENSIVE POULTRY-KEEPING 231

MONTHLY NOTES FOR POULTRY-KEEPERS 249

APPENDIX A. LINE-BREEDING WITH FELCH'S CHART 269

APPENDIX B. TABLE OF WEIGHTS AND MEASURES 271

APPENDIX C. COLLECTED RECIPES - 272

APPENDIX D. AGE OF FARMERS' BIRDS - - 274

INDEX - - - - - - 275

# UTILITY POULTRY-KEEPING

## CHAPTER I

## CHOICE AND GENERAL MANAGEMENT OF THE STOCK BIRDS

**Selecting a breed—Purchasing poultry—Housing of stock—The case for the grass run—Feeding correctly—Suitable dietaries—Care of breeding stock—Inbreeding—Cross-breeding—Breeding for egg production—Laying competitions—Trap-nesting—Management of stock ducks, geese, and turkeys.**

**Importance of Correct Management.**—For the most part the profits of poultry-keeping are dependent upon the correct management of the stock birds. Whether the "winter egg," the pedigree laying strain, or the table chicken *par excellence*, is the object aimed at, the results, successful or otherwise, are mainly referable to the parent birds. Every year the lesson of the dependence of the present on the past season's work has to be thoroughly grasped, and upon the breeding stock in particular rests the responsibility for the future.

If errors of management are allowed to creep in, whether they are of housing, feeding, or mating-up of the breeding pens, the following season will speedily show its diminution in profits and reputation. Everyone is apt to make mistakes, especially in the early stage of poultry-keeping, and these mistakes usually arise from the idea that, while young birds and chickens must have every personal care and attention, "anything will do" for the adult stock from whom the future chickens are to be bred. Fowls are not extravagant in their demands, but where first-class results are to be arrived at, these demands must be fulfilled, and that personal supervision given without which no business can succeed.

**Selecting a Breed.**—This is a highly important question, especially where profit is the goal. Soil and locality have to be taken into account, as well as the object for which the birds are being maintained (*i.e.*, egg production on commercial lines, table fowls, or a combination of the two). The number of varieties and sub-varieties is very large, but for general convenience it is customary to divide all utility birds into laying, table, or general purpose classes. In the first class are placed those breeds in which the laying capacity predominates naturally or by generations of selection; in the second, those in which edible qualities are more conspicuous than laying powers; and in the third, all the useful breeds which combine the two qualifications in a well-balanced proportion.

**Laying Breeds.**—Among this class the small, active non-sitters predominate, and the Leghorn in all its varieties—the Campine, Ancona, Andalusian, Houdan, Minorca, Redcap, and Hamburgh—are among the "laying breeds." Generally speaking, their table qualifications are a minus quantity—at all events, as far as market purposes go; but if a good strain be secured, their laying powers are remarkable.

The majority of the non-sitting class produce the bulk of their eggs in spring and summer, though many of them prove splendid winter layers as well. Their eggs are white-shelled.

**Table Breeds.**—Among the breeds noted for their edible qualities are to be found several which are good layers into the bargain, notably the Sussex and Brahma. As far as the important flesh qualities are concerned, any of the following breeds or crosses from the same will leave little to be desired: Cochin, Dorking, Indian Game, Old English Game, La Bresse, La Flèche, Malires, Sussex, Brahma, and Faverolles. These are all sitting breeds, and make excellent mothers.

**The General Purpose Fowl.**—These breeds include many of the most popular varieties, and are excellent for all-round results. One or two of them have so come to the front of late years as winners in laying competitions (notably the Wyandotte and Orpington breeds), that it seems almost absurd not to class them under laying breeds; but the fact that they are sitters, have excellent flesh qualities, and lay tinted or brown eggs, would make it a rather odd classification. In the majority of cases their eggs are produced in autumn and winter, so that, even if the total number laid during the year is not so great as that of the "laying breeds" pure and simple, the fact that they are produced just at the time when they are most profitable more than compensates. When a yearly supply of eggs is desired, it is well to keep both a light and a heavy breed, so that their laying periods follow each other.

The Croad Langshan, Plymouth Rock, Rhode Island Red, Wyandotte, and Buff Orpington breeds are all general purpose fowls; and in addition that very useful breed, the Scotch Grey, may be added, though its sitting propensities are erratic, and its eggs white or cream-coloured in shell.

**Influences of Soil and Locality.**—In certain districts some breeds appear to thrive much better than others, and when making a selection it is wise to bear this in mind. Rocks, Wyandottes, Rhode Island Reds, and Orpingtons, appear to be among the hardiest, doing well on either light or heavy soils. The Dorking appears to do better in the South than the North of England, and is usually found hard to rear on cold, clayey soils. The Barred Rock, on the other hand, is most profitable in the North of England, where, indeed, it is more largely bred, as, unless sparingly fed in the warm South, it becomes fat and lazy. We have always found the Redcap an extremely hardy fowl, doing well in widely differing situations, both on bleak hillsides and in warm valleys; but we recollect reading a statement some little time ago, in one of the poultry papers, to the effect that several poultry-keepers had found them delicate and difficult to rear. The Houdan rarely does well on heavy clay land, and prefers a limestone soil. The home of the Campine and the La Flèche is a dry, sandy soil, and it will generally be found that both breeds do best on that kind of land. Crèvecœurs, Anconas, and Andalusians, also do best on light soil. For a really hardy breed the Scotch Grey cannot be beaten; it appears to thrive in a cold climate, and even wet does not affect it to any degree.

**Free Range or Confinement.**—Some breeds will stand confinement much better than others. Where space is very limited, the non-sitting breeds will be found for the most part the best to keep, as they are more active and less liable to put on internal fat. Leghorns and Black Minorcas, Andalusians and Campines, will be found to stand even close confinement very well.

Among the heavier fowls, Rhode Island Reds, Langshans, and Brahmas, do very well, and the Rock, Wyandotte, and Orpington families, if due care is taken that they do not get too fat. Anconas, though extremely wild, will do very well in a small space, but to get the full benefit out of this breed it should have free range, where for nearly half the year it will practically find its own living, being a ceaseless forager. Like pheasants and turkeys, it thrives best when an abundance of clean, untainted land is at its disposal.

**Table of Breeds.**—This shows suitable varieties for varying conditions of range and soil as indicated by the cross ( × ). In many instances the breeds would do well under either of the alternative conditions, but this rough table will give the amateur whose resources are restricted some idea of the breeds which are most likely to succeed in his circumstances.

| Breed. | Range. | | Soil. | | Climate. | |
|---|---|---|---|---|---|---|
| | Free. | Limited. | Light. | Heavy. | Cold. | Warm. |
| Ancona .. .. | × | | × | | × | × |
| Leghorn .. .. | | × | × | | × | × |
| Minorca .. .. | | × | × | | | × |
| Plymouth Rock | × | × | | × | × | |
| Campine .. .. | | × | × | | | × |
| Orpington .. .. | × | × | × | × | × | × |
| Wyandotte .. | × | × | × | × | × | × |
| Croad Langshan | | × | | × | × | × |
| Brahma .. .. | | × | | × | | |
| Scotch Grey .. | × | | | | | |
| Houdan .. .. | | × | × | | | × |
| La Flèche .. .. | | × | × | | | × |
| La Bresse .. .. | | × | | × | × | × |
| Malines .. .. | × | | × | | | × |
| Faverolles .. .. | | × | × | × | × | × |
| Rhode Island Red | × | | | × | × | |

**Purchasing Poultry.**—Where fowls have to be bought in, it is far the best policy to pay a good price in the beginning, and get them from a really reputable yard. One regrets to say it, but there are many disappointments in store for the beginner who trusts to his own knowledge of poultry, and goes cheap "bargain-hunting" in the wrong quarters. There are only too many people who are delighted to take advantage of inexperience, and palm unhealthy, inbred, immature stock off on to someone who cannot judge correctly. Only pure-bred fowls or good first crosses should be purchased. It is courting loss to feed and house degenerate mongrels, which are frequently disastrously inbred, whereas with well-bred, healthy stock all that is necessary is to give them proper attention, and they will give proper results.

**The Deposit System.**—It is always wise to purchase poultry—unless the vendor is of known reputation—on the deposit system, as by this method fraud is rendered much more difficult. In this system the goods are sent on approval to the prospective purchaser, and the purchase money deposited with the editor of one of the poultry papers. If the goods are satisfactory, the editor is notified and the money is sent on to the vendor. A usual commission of sixpence in the pound is charged, and the very small extra expense is more than justified by the safety of the purchaser. If this plan is not adopted, goods should always be obtained on approval with the clear, written understanding that money shall be refunded if satisfaction is not given. When birds are sent on approval and are to be returned, it is the clear duty of the recipient to look after their comfort, and when sending them back to pack them properly, so that they are not damaged or their health caused to suffer in any way.

**Prices for Utility Stock.**—These vary very much, naturally, with the class of stock. For an ordinary good utility fowl of six or seven months old, roughly speaking in October or November, 3s. 6d. to 4s. 6d. may be paid. If, however, the fowls are of guaranteed laying strain, 6s. or 7s. 6d. will have to be paid; while if from a winning competition laying strain, anything from 10s. to 15s. a bird, and even higher, may be asked.

For male birds prices, of course, are proportionately higher, and a stock cock may run from 7s. 6d. to £1 1s. or £1 5s. It is only reasonable to expect that men who have given years of their life to building up a strain will want some reward for their labours, and for the most part the person who offers wonderful bargains at phenomenally low prices should be avoided—at all events by the amateur.

**Housing of Stock.**—Having selected a suitable breed, the question of housing must next be considered. The general principles of good housing include a combination of simplicity and reasonable cheapness, efficient ventilation, warmth and dryness, and perfect hygienic conditions the whole year round.

**Capacity.**—As a rule capacity determines cost, but in this case economy is not justified by results. Overcrowding is one of the worst temptations of the poultry-keeper, especially where cash is limited; but it is of the utmost importance to remember that fowls that are overcrowded *will not pay*. Each fowl ought to have at least 10 cubic feet of air space and 12 cubic feet is even better. In order to arrive at the cubic capacity of any house, multiply length by breadth by height, and if that is divided by 10 it will give the maximum number of fowls which ought to be put into the house, bearing in mind that more of the Mediterranean breeds can be put in with safety than those of the heavy varieties, and that in winter a few extra birds will help to keep each other warm. Makers of houses very often advertise them as capable of holding many more birds than they should rightly hold, so it is always wise to apply the " 10 cubic feet " test for oneself. The height of the house should be 5½ or 6 feet, as a lower house is inconvenient to clean.

Despite the extra cost, we prefer to house poultry in small flocks, not more than thirty in a roosting house, as the risk of infectious disease spreading is so much less, and the individual birds are more under control.

There should be no suspicion of stuffiness or foul air in the house, and a good test for this is to go into the house late at night, and stay in for five to ten minutes with the door closed. If the air is bad, either the ventilation is insufficient or there are too many birds housed together. It is very difficult to keep the air pure when overcrowding is allowed, and the gradual lowering of the birds' vitality which inevitably results from breathing foul air ends very often in a disastrous outbreak of roup.

**Ventilation.**—The old type of house is being largely superseded by the modern open-fronted style, which is admirable as long as draughts are avoided. Even in cold weather the birds keep in perfect health, and the houses are absolutely fresh and sweet on entering in the morning.

With the whole front wire-netted and open in summer, and with sliding shutters of canvas and wood for winter weather, the birds are much freer from colds and roup than when they are kept in stuffy buildings into which air can scarcely penetrate. Where the open-fronted system of housing is not adopted, ventilators must be fixed in the house with louvre boards, "hit-and-miss" grates, or perforated zinc, all placed 2 feet above the perches to avoid draught. An excellent method of ventilating a house consists in raising the roof ridge a couple of inches on blocks, thus leaving an air space along the apex between it and the roof boards. With open-fronted houses great care must be taken to see that the walls and roof have no cracks and crevices, or draughts will be the inevitable result. In wet weather and in driving wind the shutters must be utilized, and it must be remembered that, while foul air must be strictly avoided, the birds must be kept reasonably warm, as

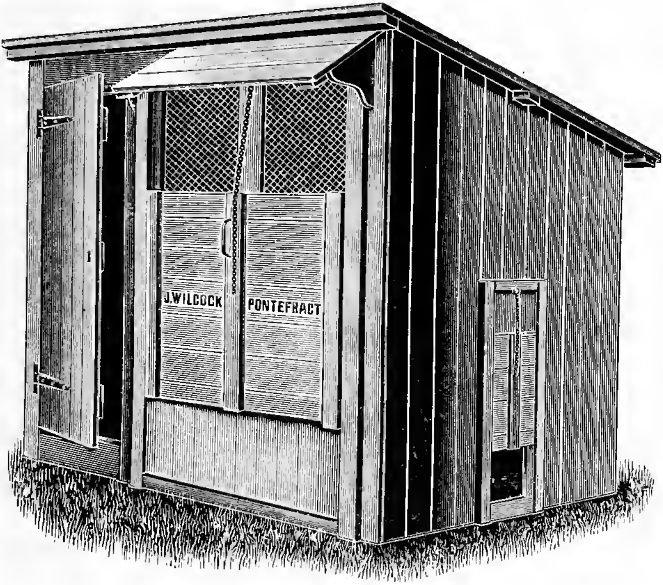

Fig. 1.—A Useful and Inexpensive Type of House.
(Made by J. Wilcock, Pontefract.)

are all other branches of stock during the winter. Bad ventilation is undoubtedly responsible for many of the ills to which poultry flesh is heir, but at the same time *extreme* exposure to cold is not likely to encourage a heavy egg yield, and a wise moderation is the best policy to adopt.

**Light.**—Dark poultry houses must be strictly avoided, sun and air being two of the best "germicides" we have, and fowls will thrive twice as well if their house is light. In a light house insect pests are kept more easily at bay, and no place that is very dark can be thoroughly clean and dry. If possible, the house should face south, and, unless of the open-fronted type, a window (also facing south) should be put in.

In summer canvas curtains can be dropped over the window, or it may be whitewashed to keep out the strongest rays of the sun.

**Material and Construction.**—Where stone outbuildings already exist on the premises, they should certainly be used, as with proper care for cleanliness, and the addition of a window if necessary, they form admirable fowl houses, neither getting very hot in summer nor very cold in winter. Wood is, however, the most common form of house, and it is important that nothing but well-seasoned timber should be used in construction. This should be not less than ½ inch in thickness, both ¼ and ⅜ inch being really too thin, unless for houses which have to be moved about a great deal, in which case lightness has to be considered. For permanent houses 1 inch thick is the best, and if colony houses are to stand in fields where horses and cattle are grazing at the same time, they ought to be thicker still, thinner wood being insufficiently strong to stand against the inquisitive habits of such animals.

New timber, especially if used for roofing, is apt to warp, with disastrous results, and very thin wood becomes baking hot in summer, while it lets in draughts in cold weather. Tongued and grooved boards obviate the risk of draughts still further, only are more expensive.

The interior of the house ought to be as free as possible from bars, beams, and crevices, in order to facilitate whitewashing and cleaning. Simplicity of design is a very desirable feature, and houses with a number of elaborate fixtures are seldom satisfactory. Houses built on the sloping principle should slope to the back, so that the water drains off properly, and the roof should always project sufficiently over the rest of the building to avoid rain dripping on to the walls.

**The Roof.**—As far as equalization of temperature goes, thatch is one of the best means of roofing, and is nearly always used for the roof of fattening sheds. Its great drawback is that it harbours vermin, and wood roofs or corrugated iron lined with matchboarding are more commonly used. Where wood alone is used, it should be well covered with tarred felting; and where corrugated iron is to compose the roof, it should have a layer of felt and a 2-inch air space between it and the matchboarding. If the roof is not thoroughly weather-proof, it will be impossible to keep the house dry, and once a year at least a fresh coat of tar should be applied.

**Preservation of Houses.**—All appliances should be properly treated with paint or some other preservative before using, or they will warp and cause draughts. Houses will last twice as long if care is taken of them; and if paint is found too expensive two coats of Stockholm tar put on hot with a tar-brush, or two coats of Solignum, will answer equally well. Very thin matchboarding houses should be tarred, covered with sheets of thick brown paper, and then coated with hot tar. The interior of houses should be limewashed twice a year.

**Damp.**—This may be caused by a faulty roof or by an accumulation of moisture under the house. The latter is very dangerous, for if an earth floor becomes thoroughly damp it will certainly injure the health of the birds perching above it, and if damp gets under a wooden floor the timber will rot. When putting up a house, eight bricks should be obtained and laid at the corner of the structure; four strong battens (say 3 by 4 inches), well tarred, should be nailed under the bottom edges of the house, which can then be erected on the bricks, and which will be several inches off the surrounding ground. If anything gets damp and rots, it will be the boards, and these can be cheaply renewed.

**The Floor.**—Cement and brick floors are to be avoided at any cost. They are very hard and cold, liable to cause bumble-foot, and soon smell badly (bricks in particular, since they are absorbent). Wood floors are draughty, and, unless very well littered, soon become insanitary.

Earth is the best flooring, and should be thoroughly well beaten down before the house is erected. If the ground seems damp, a load of dry earth and ashes should be put in, and then well beaten down again. Rats can be kept away by fine wire netting laid down in the ground before the house is put in position. If a good layer of peat moss is kept down, 6 or 9 inches deep, raked over every day, forked once a week, and renewed every six months, the earth floor will be perfectly sanitary for years; but if it should become tainted, it can be dug away to the depth of a foot or more, and then filled in with fresh-dug earth.

**Litter.**—Peat moss is the best of all litter for the roosting house, as it is such an excellent absorbent and deodorizer, and enhances rather than detracts from the value of the manure. It is soft for the birds to jump down on from their perches, and is warm and dry, so that they go to roost with warm feet.

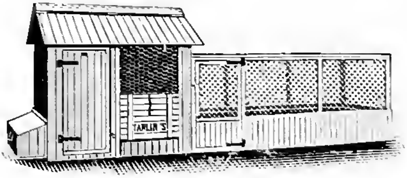

Fig. 2.—The Petersham House, with Run.
(W. Tamlin, Twickenham.)

**Scratching Sheds and Covered Runs.**—Winter layers for the most part benefit by moderate confinement during the worst months; and if a covered run or a scratching shed can be attached to the roosting house in addition to a grass run, the conditions are practically ideal, as the birds can be let out on wet days. Fowls very much dislike being in their roosting house all day, and will often stand about in forlorn groups in the rain or cold rather than seek its shelter, and this is not conducive to a full egg basket. Elaborate constructions are not necessary, a low shelter or run answering the purpose quite well; and as the side of the roosting house will make one end of the shed, only two board walls and a roof are necessary, the front being filled in with netting, except for a couple of feet at the bottom, and a canvas or wooden shutter drawn across if the wind or snow drives in. Chaff loft sweepings or dried leaves must be thickly strewn on the floor, and all hard corn scattered among it, so that the needful exercise is obtained. On wet, heavy land, when the ground is sodden with rain, it pays much better to keep the fowls in their sheds, as there is very little to be obtained from the land in winter, and if the birds have cold feet eggs will not be forthcoming.

**Perches.**—These should not be more than 18 inches to 2 feet from the ground where the heavy breeds are kept, or 3 feet if the Mediterranean breeds are in question. Sprains and bumble-foot are often caused by the fowls jumping down from high perches on to a hard floor. The "step ladder" plan of arranging perches is not a good one, as the fowls all scramble on to the top one, and falls are the result. All perches should be on a level, with a clear space of an inch between each, and out of the draught of the door. They should be movable, the ends fitting into wooden sockets on the wall, and, in order to keep red mite down, should be frequently treated with tar and paraffin. Wide perches with smooth surfaces are the best, and poles with rough bark left on them should never be used, as insects collect in the bark so readily.

**Nest-Boxes.**—These should be large and roomy, and preferably raised 6 or 8 inches above the ground to prevent egg-eating. They should be frequently dusted with insect-powder, and the straw in them renewed as often as possible. Outside nest-boxes are useful if they can be kept dark, fowls much preferring the darkest corner of the house to any other.

**Dust-Bath.**—This is an absolute necessity, though often a neglected institution. On free range fowls can find their own baths, but in small runs covered boxes filled with earth or ashes must be supplied. Ashes will, however, not improve the appearance of white fowls. A little insect-powder dusted well into the box will further assist the fowls in their efforts to rid themselves of vermin. If no dust-bath is provided, parasites will increase rapidly, and the constitution of the birds will be slowly weakened.

**Cleanliness.**—No fowls will do well for any length of time if they are kept in dirty, insanitary conditions, and the best of ventilation will not be of any use unless the matter of regular removal of the droppings is attended to.

The peat moss litter on the floor must be raked over regularly; and if dropping-boards are used under the perches, they should be scraped daily, dusted with carbolic powder, and covered with stiff sand. If the roosting house is also used as a scratching shed—a plan we do not advise unless space is very limited—particular pains must be taken, or the health of the inmates will suffer. All houses should be lime washed twice a year, and must be thoroughly dry before the birds are put back again. Nesting material needs frequent renewal, and fittings should be periodically dressed with crude petroleum.

Poultry houses which are moved about pasturelands for the sake of the manure should not be moved to damp ground after a long spell of wet weather; but, on the other hand, should not be left long enough in one place for the droppings to accumulate underneath.

**Runs.**—Grass runs are popularly considered ideal, but unless these are of a good size it may be doubted whether they are as healthy as earth or gravel. If the grass run is only of a moderate size, it is good to divide it into two parts; put the house in the middle, and use each plot in turn. Or if a small enclosed field can be obtained, and the poultry house is planted in the middle and movable hurdles are used, the position of the house can be altered from time to time, and a fresh piece of grass is thus always available.

If an earth run is used, the general method is to divide it into two portions, and crop it and stock it alternately. If a cheap, quick-growing crop like rape or mustard is put in, or if cabbages are planted as well, the land soon becomes sweet again; whereas in the case of foul grassland the best way of cleansing it is to rest it and take a crop of hay off it before stocking it again. Sandy soil will remain sweet longer than heavy land, and during the months when the grass is growing more birds can be put on with safety than in the autumn or winter. Fruit bushes will help to keep the land sweet if they can be planted. Long runs are better than square ones, the fowls moving away from the house as they use up the good grass, whereas with a square one they are over all the land at the same time. A safe estimate of the number of fowls to keep on a grass run is one bird to every 100 square feet; on earth or gravel, one to 15 square feet. As long as the grass keeps growing there is no fear of fouling, but when patches of bare earth begin to appear it is time the run was rested.

**Netting and Fencing.**—Pens are, of course, a necessity in the breeding season, and it is a wise precaution to board up the bottom for 2 feet, so that the cocks cannot see each other. If the netting is 6 feet high, the posts to hold it up should be 7 feet 6 inches long, the lower 18 inches well tarred and pointed, so that they can be easily driven into the ground. Fencing stakes bought ready-pointed should not cost more than ½d. per foot, and in many parts of the country rough poles can be purchased cheaply. The other is, however, really the better purchase, unless for temporary structures.

The usual mesh of netting in use is 2½, with a 16, 17, or 18 inch gauge, and all netting should have been well galvanized before being used. If a strand of wire is run along the top of the posts, the wire can be drawn tightly with no fear of sagging.

**Feeding.**—Having considered the housing of the stock birds, the matter of their correct feeding must next be considered. The poultry-keeper of to-day has no excuse for haphazard use of foodstuffs since the art of feeding poultry has been developed into an exact science.

Analysis of the body of a fowl shows that a number of different elements are necessary for its maintenance and renewal, and the foods supplied must be of such a nature as to fulfil these requirements.

Similarly, the composition of an egg being determined, it is obvious that the diet which most nearly approximates to these constituents will be the one most likely to produce the largest quantity of eggs.

**Necessary Elements for Maintenance of Body.**—For the upkeep of the body of the fowl, the following elements are necessary : The albuminoids or nitrogenous materials, which supply the elements necessary for the growth of flesh and tissue ; the carbonaceous materials, including fat and oils, which help to maintain the supply of heat in the body necessary for all vital processes ; the salts and minerals which are required for the building of bone, blood, muscle, feathers, and shell ; the husk or fibre, which, of little value as a foodstuff, is nevertheless of value in aiding digestive processes ; and last, but not least, water.

It is important to remember that these necessities for the body of the fowl have to be supplied *first*, before the production of eggs, which is an extra process, can be carried on, that food alone which is not needed for sustenance and repair of tissue going towards the formation of eggs. Consequently, if fowls are underfed or fed on unsuitable foods, the egg yield is bound to go down; but if, on the other hand, a common-sense, well-balanced diet is provided, there will be plenty of material to spare for the production of eggs after the necessary "body-building" rations have been abstracted.

**Constituents of an Egg.**—An egg contains 10 per cent. carbohydrates, 75 per cent. water, 12 per cent. albuminoids, and 3 per cent. salts. The foods supplied must therefore include these elements.

**Nutritive Ratio.**—In order to choose suitable foods for their fowls, poultrymen divide all foods roughly into two classes—the nitrogenous and the carbonaceous—and the correct proportion between the two is called the "nutritive ratio." As a rule this is considered to be 1 to 5 (*i.e.*, 1 part nitrogenous to 5 of carbonaceous), but growing stock require a higher ratio, and 1 to 3 is more suitable for them. Fowls not in actual lay may have 1 to 6 or 1 to 7, but even 1 to 5 is not sufficient for a heavy layer, who is engaged not only in repairing the great waste which goes on under those circumstances, but who is also manufacturing a large number of eggs, and 1 to 4 will be found more likely to give good results. Suitable food tables can be easily built up by means of this, as it is only necessary to know the chemical composition of any food to recognize its value and the best methods of combining it with others.

It is, of course, generally understood that, when arranging a balanced diet, the indigestible portion of the food, husk, etc., is ignored, only the digestible portion being included in the reckoning.

**Some Common Foods and their Values.**—Among grains most commonly used for poultry are wheat, barley, oats, maize, dari, buckwheat, peas, beans, etc.

**Grain Foods.**—Wheat is a valuable grain, especially for summer use, but is slightly deficient in fat and albuminoids.

Barley is a good grain and slightly heating. It is useful for pullets that are coming on to lay, but if used too freely in damp weather and on heavy soil has been thought to cause liver trouble.

Oats are the best of all grain for laying fowls, the ratio very nearly perfect (about 1 to 5). Heavy sound oats should be used, and clipped oats (*i.e.*, those which have the husky tails removed) are excellent.

Maize is both fattening and heating, on which account it is valuable as a winter food if used with discretion, but if too freely fed will cause liver derangement and internal fatness.

Buckwheat is not nearly as much used in England as in France, but is useful in the moult and very rich in carbohydrates.

Dari is useful as an alternative grain, and may be included in a "moulting" diet with benefit.

Beans and peas are best fed split, and for summer use are of great value, being very rich in albuminoids.

**Soft Foods.**—There is a long list of "soft foods," all of which can be used in the composition of the morning mash, and this does not include any of the excellent cooked foods on the market, many of which are of great value and of reasonable price. "Middlings," "sharps," or "thirds," are often the same thing known in different localities by the various names, and all consist of the coarser part of ground wheat as distinguished from flour and bran. There is no clearly-defined standard for the food, and consequently it varies in value, but taken as a whole it is most useful as a general meal for young stock or adults.

Bran must be considered an excellent and very nutritious article of poultry diet, its drawback being that it is rather indigestible; but if thoroughly scalded and dried off with sharps it makes a good mash.

Ground oats is, of course, the fatting food *par excellence*, but hardly suitable for the laying and breeding stock on that account.

Peameal and beanmeal are useful as a substitute for animal food, and where a high nitrogenous ration is required for laying or moulting fowls, they cannot be beaten if used in conjunction with other foods.

Biscuit-meal, especially those samples which contain meat, though an expensive is a splendid egg-producing meal.

Potatoes and bread, though they may both be used in reason, are too starchy, and in consequence too fattening, to be advised as a daily article of diet.

**Food Tables.**—The following simple combinations of foodstuffs are among the most commonly used; and since variety forms part of the art of feeding poultry, the changes should be rung on these and on other foods as frequently as possible.

### *Soft Food for Winter Layers.*

I.

4 parts scalded bran.
2 ,, cooked barleymeal.
2 ,, peameal.
½ part cooked lean meat.
1 ,, scalded clover hay.

II.

2 parts scalded bran.
2 ,, sharps.
½ part potatoes.
2 parts lean meat.
1 part boiled cabbage.

### *For Moulting Stock.*

3 parts biscuit-meal.
2 ,, peameal.
1 part bran.
½ ,, stewed linseed.

### *For Laying Stock.*

1 part granulated meat.
3 parts middlings.
3 ,, vegetables (cooked).

### *For Growing Stock.*

2 parts middlings.
2 ,, barleymeal.
1 part scalded bran.
1 ,, cooked lean meat.
1 ,, ,, vegetables.

### *A Summer Ration.*

2 parts cut green bone.
3 ,, scalded bran.
2 ,, sharps.
3 ,, cooked cabbage.

Suitable grains should be fed with these at night, giving one kind at a time, and avoiding the compound known as "mixed corn" — consisting very often of inferior grain and sweepings—as the plague. Wheat and oats with peas and beans are the most suitable summer grains, while barley and maize may come into the winter dietary, and rapeseed, sunflower-seed, dari, and buckwheat, be added as delicacies during the moult.

**Meat.**—Winter layers ought to have 2 ounces of meat daily allowed to each bird, and cooked paunches or bullocks' lights are the most suitable and inexpensive forms of meat. Much fat meat is not advisable. Where fresh meat is not obtainable, granulated meat may be used; but it should be well soaked in boiling water before being used, and the liquor containing the preservatives thrown away. The water in which lights, etc., have been boiled can, however, be used with advantage to mix the soft food. Crushed green bone (*i.e.*, fresh bone) is one of the best egg producers which can be found. Blood from a slaughter-house can sometimes be obtained, and, although disagreeable to handle, is very valuable indeed.

**Green Food.**—This is an absolute necessity if fowls are to be kept in good condition, and if a high egg yield is to be maintained. Birds on free range can always obtain plenty for themselves, but birds in confinement need a regular supply of fresh greenstuff, and will lay far more eggs if this is supplied. Grass, lettuce, dandelion, nettles, swedes, turnips, onions, beetroot, red clover, and cabbage, can always be given with advantage, and the refuse of a vegetable garden will be greedily eaten. Very coarse, stringy leaves should not be given, or they may cause obstructions in the crop, and diseased or decayed vegetables should never be supplied. In winter, when it is not always possible to obtain as many vegetables as are necessary, steamed clover hay prepared overnight, and mixed with the morning soft food, is an admirable substitute, clover containing an enormous amount of lime and being a grand egg producer. Where the supply of green food is regular the egg yield will be good, but where it is erratically supplied, with abundance one week and scarcity the next, digestion and bowel troubles will often be caused. In winter-time swedes and turnips or cabbage-heads, cut in half and hung by a string in the run, will afford pleasure and exercise.

**Water.**—Bearing in mind that an egg consists of 75 per cent. of water, it is obvious that fresh, clean water is a vital necessity to fowls engaged in egg production, as well as for the need of their own bodies. In winter it is well to take the chill off the water (but never to give it *warm*), and fowls should not be permitted to drink water into which snow has fallen, or over which ice has formed, as they waste away and become quite emaciated if allowed much snow water. In summer the water vessels should stand out of the rays of the sun, and in all seasons they should be kept scrupulously clean. The simpler the form of water vessel the better, in order to facilitate scrubbing and scalding. Enamelled tin vessels are better than any other kind, and if galvanized iron ones are used it is important to remember no chemicals should be put in them.

During winter Douglas mixture (a combination of ½ pound of sulphate of iron and 1 ounce of sulphuric acid dissolved in 2 gallons of water), in the proportion of two tablespoonfuls to each pint of water in the water vessel, may be added as a tonic and preventive of roup. If a shallow dish is used, it should be raised a little above the ground, so that the fowls cannot scratch dirt into it.

**Grit.**—Flint grit is an essential to health, and if a constant supply is kept before the fowls they will use it as required. As the grit is swallowed, it passes into the gizzard of the bird, and is retained to grind the food till the sharpness has worn off. Sharp grit ready-crushed should be used, but broken glass and crockery are not suitable, as they might lacerate the intestines.

**Oyster-Shell.**—Many people consider that, where grit is supplied to help in the digestion of the fowl's food, oyster-shell is not required; but unless a good supply of lime is present, either in the run or given artificially, the eggs will tend to become soft-shelled. When clover or green bone is provided, less will be necessary. Oyster-shells may be crushed with a grit-crusher, or if put in a pail with slaked lime, covered up, and left for a day or two, they will be rendered brittle and easy to break up.

**Quantity of Food to Give.**—No fixed scale is possible in the feeding of poultry, as quantities vary so tremendously according to a number of different factors. In summer fowls will do with much less food than in winter, since they find their own natural food. Heavy Asiatics will eat as much again as some of the light breeds, while a fowl whose egg organs are idle requires half the quantity of one who is engaged in production. The golden rule in feeding is, never to put so much down before the fowls that any is left on the ground. If fowls stand inactive after their morning meal, then breakfast should be reduced to a half-ration, and a grain feed be buried later in the morning to induce exercise. A rough guide is to allow one average handful of grain to each bird per diem, and two to three ounces of soft food when mixed.

It is always well to give a substantial evening meal, so that the birds go to roost with full crops. Overfeeding is to be strictly guarded against, for not only will laying (at first, perhaps, stimulated) be checked, but the internal organs become coated with fat, and the egg organs and ducts become congested and possibly diseased.

Birds should be handled on their perches at night to discover if they are getting too fat. If the crops are about half full at midnight, then the quantities given are about right. An overfat condition can generally be detected by handling, but if any doubt exists it is better to kill a bird and examine the intestines. No fat birds can be good layers, and if any stock is overfed it puts on fat, not frame and muscle.

**Methods of Feeding.**—Soft food is as a rule given in the shape of a warm mash in the morning. Some authorities recommend an evening mash, and a morning feed of grain; but the majority of poultrymen adopt the former method, as the grain takes longer to digest, and consequently lasts the bird through the long nights better. Soft food should be fed in troughs made of wood or galvanized iron. The wooden ones are cheaper, and are easily knocked up at home. Most of the big appliance makers send out different patterns of iron or enamel food troughs, but so far the only large maker of wooden ones with whom we are acquainted is Wilcok, of the Steam Saw Works, Pontefract. We mention the name because we understand that several correspondents to whom we recommended wooden troughs have had difficulty in obtaining them unless they had them made at home. There is less risk of contamination, and far less waste than when food is thrown on the ground, as what is left can be removed, none is left to get sour, and the quantity may be reduced if necessary next meal. Soft food should always be mixed to a crumbly consistency, so that it breaks when thrown on the ground. Birds hate a sticky mass, which clings round their beaks. The use of soft as well as of grain food is always advisable, since it is so easily digested, nourishes rapidly, and increases the size more than where corn alone is used.

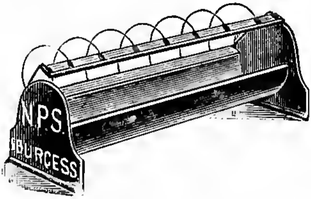

FIG. 3.—FEEDING TROUGH.
(The New Poultry Syndicate.)

In summer birds on free range will do very well on two feeds of corn a day and no soft food; and if they can be moved about all the year round on clean pasture, ploughed land, and stubble, the food bill can be very much reduced.

Birds in confinement in the summer months should have one soft and one grain meal a day, and a little greenstuff at midday.

In winter, birds on free range should have a soft feed in the morning, and a liberal feed of corn just before dusk; but those in runs should have a half-ration of warm food first thing in the morning, grain buried in the scratching litter to provide exercise, meat and greenstuff at midday, and a good feed of grain for the last meal of the day. In very cold weather it is an excellent plan to boil the grain on alternate nights, and feed it warm. It should be put in a covered saucepan with enough water to cover it, and then allowed to boil until it swells up and the water is absorbed, but it must not be allowed to burst. The use of sprouted oats as a feed for poultry is becoming increasingly popular, and appears to give excellent results. With thoughtful selection of the foodstuffs which make up the diet, avoidance of over- or under-feeding, a proper supply of water, greenstuff, and grit, and regular attention, the feeding and management should present no difficulty, and, given healthy stock, excellent results should be obtained.

**Breeding.**—Every care and attention must be paid to stock birds used in the breeding pens, since upon their vigour will depend the stamina of the chickens to be hatched from their eggs. If chickens are to be bred which will be easy to rear, capable of making good growth, and developing finally into first-class layers or breeders in their turn, it is of the utmost importance that the parent stock be of the best.

**Choice of Fowls.**—It is absolutely essential that all stock used for breeding should be strong and healthy, and themselves come of healthy parentage. Crooked-breasted fowls or those showing any other bodily defect should be excluded that the faults may not be perpetuated. Both parents should never possess the same defects, and, conversely, if good qualities are possessed by both male and female there is the greater chance of the qualities being fixed in their progeny. Breeding from immature stock is to be deplored, and results in many unfertile eggs, and in small weak chickens, which will never in their turn make good stock-getters.

If possible, both birds should be over twelve months, but at any rate not under the age of ten months, before being bred from, and cockerels and pullets should never be mated. We never advise the mating even of pullets and a cock, though this is very frequently done, but from our own personal experience we do not recommend the practice, preferring to use two-year-old hens and a twelve- or fifteen-months cockerel. A hen is not really in her breeding prime till well on into her second year, but a well-developed, early-hatched cockerel should give good results. The birds should be active, of good constitution, and in hard condition, when put together in the pens, and all details relative to the objects aimed at should be well thought out previous to mating, as mistakes are not easily rectified.

**Choice of Male Birds.**—As a rule the male bird is considered to affect the outward, and the hen the inward, qualities; and though this is true generally speaking, yet the cock has more influence on economic characteristics than might be at first supposed. The male bird is half the breeding pen, and if carelessly chosen may lower the standard of the yard very considerably. The stock bird should be of good size, large-framed but not fat, and firm in body, with good legs wide enough apart to make him stand well. If the object of mating is to produce a strain of layers, he should be well developed in the posterior region, and fairly tall on the leg, with an active habit of body. If, on the other hand, table birds are the object aimed at, the male bird should be well developed in the region of the breast, having a heavy body with good depths and fairly short legs. Males which have matured very slowly seem to transmit this quality to their progeny, and this is an often unsuspected cause of the late development of young stock. At the same time, the rapidly-maturing birds rarely make the most reliable breeders.

**Choice of Hens.**—If for the laying strain, those should be selected which are of medium size, having an active body, a good capacity for work as evinced by their zealous scratching, and which are well developed in the region of the egg organs. If table birds of large size are desired, the hens must be big also and square in body, having a long, deep, and broad breast, and no suspicion of crookedness in the breast-bone.

The best chickens resulting from each year's mating and breeding should always be retained for the home-breeding pens; only in this way can a really good strain of fowls be built up.

**Number of Hens to Cock.**—This varies widely according to the month of the year, the kind of fowl, and the conditions under which they are kept. In warm weather many more birds can be run together than in the cold months. For the very early months of the year from four to six hens of the heavy breeds may be run with a cock, and from six to eight of the Mediterranean breeds; while in the spring and early summer eight to twelve of the heavy, and twelve to sixteen of the light, breeds may run safely with their respective males. If the fowls are on free range, more hens can always be put to each cockerel than when only a small run is available. If eggs are proving unfertile, it may be that there are too few or too many in the pen, and one or two hens will have to be added or removed. Sometimes a cock will single out one or two of the hens particularly, and if this is the case (usually denoted by the bareness of the hen's back) these hens should be removed from him for the greater part of the day.

**Other Causes of Unfertile Eggs.**—Too stimulating a diet, a snap of cold weather or of driving rain, want of exercise, lack of greenstuff, damp runs, unhealthy birds, and immaturity of the males or females, may all be the cause of unfertility in eggs.

**Control of Sex.**—Many theories have been advanced in this matter, but in practice they all break down. It has been established that in early broods there is a predominance of cockerels, and that the prepotent parent produces offspring of the same sex, but the latest observations appear to show that the feeding of the hens has more to do with the control of sex than any other factor.

**Mating-up.**—For the production of table fowls pens must, of course, be mated, and eggs set all the year round. For spring chickens pens may be mated up in late November or the beginning of December, and dispersed in May or June; but for the laying stock there is no need to hatch the heavy breeds before February, and the light breeds before April, so that later mating can be adopted. Spring-mated pens usually produce more fertile eggs as the months advance. In any case, the pens should not be allowed to run on too long before breaking up, or the birds will get bred out.

**Management of the Male in the Breeding Pen.**—In order that the male bird should be of absolutely unimpaired vigour, he should only be permitted intercourse with the hens during the breeding season, or else the chickens produced from him will fail to be strong. People make a great mistake in purchasing stock cockerels, in that they do not always make sure that the birds have been separated from the pullets at a sufficiently early age. A cockerel which has been allowed to run on with them becomes bred out and incapable of producing vigorous offspring. Before putting the male bird in the pen, he should be well fed for a few days, having plenty of cooked lean meat and a tonic in the drinking water. If he is in good condition, strong, fertile eggs may be expected eight or ten days after he is introduced to the hens. If for any reason it is desired to make a change of sire, a fortnight should elapse before setting eggs afresh. An over-gallant male will often stand aside while his hens feed, and will in consequence become half starved and out of condition. It is a wise precaution to give him a meal by himself (including lean meat) once a day, and if he is very active he should be shut away from the hens for part of the day.

**Inbreeding.**—As far as possible in utility poultry work this must be avoided, since vigour and stamina are both likely to be reduced if closely related birds are mated together. Where several pens of the same variety are kept, the chickens should always have distinctive marks, so that there is no danger, when they are to be used for breeding, that those of similar parentage are put together.

This plan has nevertheless to be materially altered very often ; for though fresh blood ought to be introduced into utility yards every year, it must never be in a haphazard manner, or the labours of years might be broken down.

Suppose that a first-class laying strain had by careful selection been evolved, if a male bird were introduced from a yard where only a poor egg average was maintained, and where no care had been taken to breed only from the best layers, such a bird might spoil the reputation of the yard he had just entered for two or more generations. In consequence, the utility breeder is constantly waging a kind of battle between this danger, on the one hand, and the knowledge, on the other hand, that it is fatal to use too closely related birds when great productiveness and hardiness in the offspring is desired.

**Cross-Breeding.**—For many purposes the first cross fowl is highly useful, since, if suitably bred, the resulting birds will be hardy, of large size, and possessing good economic qualities. Crossing takes place for many purposes: to improve the size or quality of a breed for table purposes, to increase the egg yield, the size of eggs produced, or to produce tinted shells.

It must be understood that mongrels whose parentage is doubtful, and who have probably been inbred, are not advised; but a good first cross, combining the blood of two distinct varieties, will have the good qualities of those two breeds combined in the one bird, together with increased hardiness of constitution. Admittedly the value of such birds is less than pure-bred ones: for whilst they cost the same to feed and house, their live offspring will fetch much lower prices; but for economic purposes, the production simply of eggs and table fowls, they are distinctly useful.

Breeds of opposite characteristics should be mated in order to get the best all-round results, though it is better to use, both on the male and female side, birds from recognized "table breeds" when breeding for table only. If a non-sitting and a sitting breed are to be used for table chicken purposes, the male should come from the sitting breed, and should have a large square body with short legs and a neat comb. If the laying cross is required, it is best to allow the male to come from the non-sitting strain as a general rule (though this does not always apply); and where tinted eggs are needed, the females should come from a breed laying brown-shelled or tinted eggs.

**Useful Crosses.**—For laying purposes the following first crosses will be found most useful: Leghorn-Wyandotte, Ancona-White Orpington, Houdan-Orpington, Minorca-Houdan, La Bresse - Wyandotte, Leghorn Langshan, Minorca-Rock.

For table purposes the following are excellent: Indian Game or Old English Game-Dorking, Faverolles-Buff Orpington, Houdan-Orpington, Langshan-White Orpington, Sussex-Orpington, Sussex-Silver Dorking, etc.; while as a combination of sitting and non-sitting breeds for all-round purposes one might select Langshan-Rocks, Houdan-Minorca, Ancona-Orpington, or Buff Leghorn-Buff Orpington. An illustration of the value of crossing might be taken from the Ancona-Orpington selection. This forms a splendid laying cross, standing confinement well, laying *brown-shelled* eggs, produced for the most part in the winter months. The table qualities are fair, and the chicks are fast growers, taking the size from their mothers, while the broody inclinations of the Orpington family are kept down by the Ancona blood.

Of course, every poultry-keeper has his favourite first cross, and the list might be extended almost indefinitely. First crosses should not be crossed again, but either renewed entirely each year or kept on the "one-pen cross system"—*i.e.*, mating a cock of the original breeds in alternate years.

**Size in Poultry.**—To the table fowl breeder who desires big, vigorous stock birds to produce his quick-maturing chickens, size is of great importance, and to attain this end both parents must be of good proportion. The size of the male bird, as has been pointed out before, is of great importance, but it is equally essential that no hens which are undersized or lacking in excellence of growth and constitution be used, in order to attain a flock of more than average size.

The egg producer does not have to take this matter into account nearly so much, since the moderate-sized birds are nearly always better layers than the very big ones in the flock. This may be partly due to the fact that exceptionally heavy layers generally start their work at an early age, and rarely escape from having their growth somewhat retarded. The size of a bird, again, is no guarantee of the size of the eggs which will be produced, as the small birds often lay the biggest eggs. From his point of view there is, therefore, no special advantage in breeding for size, or in retaining in the laying flock birds of great bulk and heavy build, since they will materially increase his food bill.

**Breeding for Pedigree Layers.**—The laying capacities inherent in the common hen have in the past been sadly under-estimated, and even to-day there are thousands of yards where averages much below the possible are being made. The vast majority of poultry-keepers are content to keep hens not averaging more than 90 or 100 eggs per annum, while the pedigree layer of to-day will scorn anything under 200.

In founding a laying strain, no consideration but prolificacy has to be taken into account, and, bearing in mind that the capacity for egg production is hereditary, only the best layers must be bred from. By the use of trap-nests, and the careful keeping of the register of produce of each hen—that is to say, the age at which the hen began laying, the months in which she laid, the number of eggs produced each year, their size, etc.—a good useful strain of layers can be built up by any painstaking poultry-keeper.

**Strain.**—There is even yet great room for improvement among the *average* flock of hens kept for purely utility purposes, and in beginning to improve the laying qualities of a yard the importance of *strain* has to be considered.

It is not breed, but strain, that counts, and there are good and bad strains of every breed and sub-variety which the poultry world knows. The Utility Poultry Club, in arranging its laying competitions, has always laid stress on the point that the competitions were not held to decide the excellence of any one particular breed, but to make known those fowls which during the four months of the year under systematic treatment proved themselves to be good layers. The fact that some breeds, such as White Wyandottes or White Leghorns, have figured so frequently among the prize-winners simply means that both these breeds have been specialized in from an *egg point of view* for a considerable time, and the same applies to the Buff Orpingtons and one or two others which have appeared frequently near the top of the sheet.

A glance at the breeds of winners from the year 1897, when the first competition was held, to the year 1912, will show Minorcas, Buff Leghorns, White Leghorns, Silver Wyandottes, Barred Rocks, White Wyandottes, Golden Wyandottes, Buff Rocks, Buff Orpingtons, and Black Leghorns, figuring at the top of the list in different years, while excellent scores have been put up by many other breeds.

As showing the great improvement in the laying qualities of present-day birds, it may be noted that in the first Utility Poultry Club competition, extending for four months in 1897-98, the top pen (of four birds in a pen) only totalled 161 eggs; while in 1910-11 the birds in the Northern Competition totalled 301, and those in the Southern 272, eggs.

**Laying Competitions.**—The effect of these and other laying competitions has been, not only to set a very high standard for others to emulate, but to plainly demonstrate the value of scientific breeding for eggs.

In America and Australia the fact has been recognized with even more fulness than in England. The present winners of the world's record for twelve months—the six White Leghorn pullets who laid 1,589 eggs between them at the Government poultry-station at Roseworthy, South Australia — are convincing proof of this, for their parents were the famous "Padman" strain which previously held the world's record, and which has won ten laying competitions. Stock from this strain of fowls has had most far-reaching results, birds being sold both to England and America, while we find that 70 per cent. of the prominent competitors in the Australian (and New Zealand) competitions had bred their birds or had eggs from the Padman yards. This ought to be a sufficient refutation of the statements recently made by those who contend that the capacity for inheritance of shape, size, or colour, is hereditary, but that high egg production is *not.*

In building up a strain it is important to remember that, while all hens possess *some* power of egg production, the quality may be reduced or increased solely by careful selection.

**Building up a Strain.**—Early maturity, the capacity for winter laying, when eggs are at their dearest, the number of eggs laid in the first year, and the size of eggs, are all points to be taken into consideration. Early maturity is very largely a matter of heredity.

**Age for Laying.**—Selected flocks of birds will lay at six or seven months, whereas a miscellaneous lot of birds may not begin until they are ten months or a year old. Many males are of slow growth and transmit backwardness to their progeny. It is not wise to hatch pullets too soon, or they will come on to lay in the summer, commence moulting like older fowls, and lose a good part of the winter. Neither should they be hatched too late, or they will not lay sufficient eggs during the winter to pay for the extra cost of their keep.

**To Prevent Pullets Laying.**—It is not wise to permit pullets to lay under six months of age, or their growth will be stunted and the eggs too small. In order to prevent their doing so, they should be kept on a spare grain diet, and moved as often as possible to fresh ground, as that helps to check laying.

**Dates of Hatching.**—Late February and March are the best months for hatching the heavy, slow-maturing breeds, and April and May for the light breeds, as in both cases the pullets will come on to lay in autumn, when eggs are scarce.

**Size of Eggs.**—Fowls which prove to lay a very small egg are not profitable for commercial purposes, as the 2-ounce egg is the most acceptable in the general market. Certain strains of Hamburghs were noted some years ago for the number of eggs they produced, but the eggs were so small as to be of little market value.

**Averages.**—While the ordinary barn-door fowl would rarely reach 100 eggs per annum, a good flock of layers would *average* 140 to 160 eggs in the same time, and the object of the breeder should be to double this during the hen's first year of laying. Commercially, of course, we have to reckon with the high average rather than with the extraordinary individual record.

One of the most remarkable hens in the United States of America is "Lady Cornell," belonging to the Cornell Poultry Station, who in her first year laid 257 eggs, and in her second has laid just over 200, all of good size; while "Madame Cornell," in the same flock, laid 245 eggs in her first year. These two hens and thirteen others of the highest producers *averaged* 236 eggs each, and the managers attribute these high records to careful feeding, housing, and management, in addition to the careful breeding for laying purposes from hens possessing good vigorous constitutions.

**Productive Period of Hens.**—The best authorities state that each hen starts life with a capital of 500 or 600 eggs in the ovary; but whilst it is unlikely that this number is exceeded, the possibility of all the eggs being developed depends to some extent upon strain and feeding.

The natural habit of the fowl in the wild state is to lay forty or fifty eggs a year for about ten years, but as the hen became domesticated, and was looked upon as a commercial asset, this spreading of the eggs over a number of years was bound to give place to a higher average number yearly, even at the cost of a restricted prolific period. By careful breeding and feeding the average has gone up, and to-day we have fowls with averages of 150 to 250 eggs per annum. In the majority of cases a hen ceases to be productive after her third season as a layer. Unless a bird is a phenomenal layer or an exceptionally good stock-getter, it is rarely worth while to keep her after she is two and a half years old, as the system, being exhausted by the great drain on it which has taken place, cannot possibly maintain an equal rate of productiveness during the third and fourth year.

**Pullets as Layers.**—The pullet is more productive than the hen from the point of view of number of eggs, though not always from that of size, as many pullets lay small eggs, and many breeders annually renew their laying flocks, as they claim that any loss caused by the purchasing and selling is covered by the extra numbers of egg produced by the young birds.

One extremely important point to be borne in mind is that the first season's productiveness counts for a great deal in the total profit of a layer's active career. Birds hatched too soon which go into moult, and do not recommence until late in the winter, or birds which (by reason of late hatching or inherited slowness of maturity) commence their laying after the demand for "winter eggs" at high prices is past, will never yield the profit which may be obtained from those birds which begin operations at the right time. The object of all breeders should be to have a nice flock of pullets which start laying between their sixth and seventh month.

A good arrangement of the laying stock would be as follows: March-hatched pullets of the current year, year-old hens hatched the year before, and two-year-old hens of the March previous to that. These last could be used in the breeding pens, and either disposed of in the spring or summer, the stock being renewed from the chickens of each year. Old hens are very liable to internal troubles, owing to their tendency to put on fat, and once a year every yard should be thoroughly overhauled, and any cumberers of the ground ruthlessly sorted out.

**Disposal of Old Hens.**—Very ancient "biddies" can be used for the home table—if boiled gently for a good period they will not make a bad dish—but old birds should not be sent to the market. There is a large demand among the Jewish population of the country for live fowls, and fat old hens will fetch from 1s. 9d. to 2s. 3d. according to their condition, June and July being the best months. No sign of moulting must appear, or the hens will be tough and poor. It is wise to feed liberally for a fortnight or three weeks before sending them, so that they will sell as well as possible, and so that a few extra eggs may be obtained.

In winter and very early spring gamekeepers and large poultry farmers who require broodies for their early chicks will pay 3s. to 4s. 6d. for a large motherly old hen, and it will pay to induce broodiness, if no signs of this condition are apparent, by shutting the hen up in a darkened coop and feeding liberally, including buckwheat in the bill of fare.

**The Trap-Nest.**—Where pedigree layers are desired, the use of the trap-nest in one or other of its varieties is essential, and probably no appliance has had more important effects upon the poultry industry than this one. The use of such nests enables the user to ascertain the actual laying powers of each individual hen without any possibility of mistake, and to weed out for table all those fowls which come below a profitable average.

By the aid of the trap-nest breeding operations can be brought much more under control, since if each hen in the pen is ringed and numbered there is no possibility of setting eggs from a hen of inferior capacity, and all unfertiles can be traced back to their source.

The best form of nest is that which is simple of construction and easy to work, and which will not frighten the hen as she enters. Some birds have a great objection to using the nests at first, but a little care and patience will obviate this. It is a mistaken idea to imagine that one need be constantly running in and out to the nest; it does a hen no harm to be left in a little while, and one or two rounds in addition to the ordinary feeding times will usually prove ample.

Autumn offers a good opportunity for making a start in the use of trap-nests; the pullets will be commencing their work, and the old hens will be finishing their moult and ready to begin as well.

**Treatment of Fowls in Moult.**—Every year a complete moult takes place, and, being a natural process, should not cause any serious trouble; yet it is a drain on the system, and many fowls, especially as they get older, or if they are in low condition to begin with, suffer a good deal under the process of casting and growing their plumage. In order to hasten the moult, so that it takes place during the warm weather (the natural period being in the autumn), it is advisable to pen the birds up in a sunny spot, and put them on to low diet to stop the production of eggs, gradually increasing the food rations once the casting of feathers has really commenced, until they are having liberal diet. In the menu should be included bean or pea meal (which helps to produce feather material), sunflower-seeds, and stewed linseed, with a little hemp or rapeseed as an "extra." Sulphate of iron or Douglas mixture in the drinking water will act as a tonic, and, if the weather is warm, a pinch of sulphur in the soft food twice or thrice a week. Parrish's food is an excellent tonic to administer if any fowls seem out of condition.

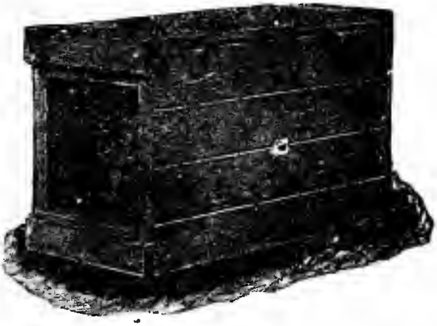

FIG. 4.—TAMLIN'S TRAP-NEST, SHOWING NEST SET.

**Condiments for Poultry.**—It is the height of folly to be constantly dosing stock birds with stimulants and ovary tonics, since the natural result is to overwork the organs and render the fowls unfit for breeding. Stock birds which are to be bred from are best with as little spiced food as possible until the weather is bleak and trying. We except saccharated carbonate of iron, which is a valuable tonic, and a *small* quantity of mustard, which, according to the results of the very careful Allen experiments, has been found to have no deleterious effect upon breeding stock.

Layers pure and simple, on the other hand, must be slightly forced if they are to be profitable; and provided poultry spices are used *with discretion* they are not harmful. It is only *their abuse* which ruins the constitution of a bird.

**The Winter Eggs.**—Briefly summarizing, it may be repeated that to obtain the profitable winter egg we must follow in the wake of our American cousins, who were undoubtedly the pioneers in the matter. We must breed only from the best layers, hatch at suitable dates, feed on scientific lines, house comfortably and hygienically, provide scratching shed exercise, and avoid damp, overcrowding, overfeeding, and inbreeding, together with any other feature which militates against successful egg production.

## Management of Stock Ducks.

**Suitable Situation.**—Where duck-breeding on a large scale is to be carried out, exposed land of a wet and heavy nature is less suitable than a sheltered valley where the soil is light and gravelly. Running water, either a lake or stream, is essential for the fertilization of the eggs of most breeds of ducks, the Indian Runner being perhaps the only *reliable* exception. Where strongly fertilized eggs are desired, however, the physical comfort of the birds has to be considered, and an effort made to approach to natural conditions as nearly as possible.

**Shade.**—Shelter other than that of their houses must be provided, ducks suffering severely from strong heat and sunshine. Many annual losses are caused by the fact that people put ducks on a closely fenced pond lacking either trees or shrubs or the shelter of long grass.

**Housing.**—This may be of a very simple character, but it is essential that the roof, floor, and sides, should be sound, and that the water should not be able to reach the house, though at the same time the house should be *near* the water. The ventilation should be good, and the floor cleared daily and kept littered with plenty of fresh dry bedding. It is better to have several small duck houses than one very large one.

**Breeding Stock.**—These should be for preference large-boned birds, but not too large or heavy, of good average shape and quality, and full of vigour. The usual arrangement is a pen of one drake and two ducks, or else two drakes and five ducks. Inbreeding must be sternly condemned; and while many breeders use young birds on both sides, the best hatchings are usually from second year drakes with eight- or nine-month-old ducks at the time of mating, which is usually in October.

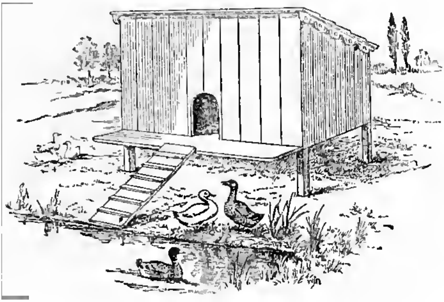

FIG. 5.—LEAN-TO DUCK-HOUSE.
(New Poultry Syndicate.)

**Feeding.**—Any fattening or forcing foods must be avoided. Ducks are large eaters, and when producing eggs need extra quantities of nitrogenous food. Where free range is given, two meals a day are plenty, in cold weather giving a warm morning mash. The mash may consist of oatmeal, sharps, and wheatmeal, substituting barleymeal for oatmeal in winter. Green food must be supplied, and sharp flint grit always at hand. For the night feed, grain may be put in the water troughs, wheat and oats being given alternately with a little maize in winter. Stock ducks should be shut up in their houses till about ten in the morning, when they will have laid their eggs; otherwise they may lay them in the water, and they will be lost.

**Laying, Table, and General Purpose Breeds.**—The Indian Runner is the "laying duck" for general market purposes. The Aylesbury or Aylesbury-Pekin is the best market duckling, but the eggs produced are also of very good size. The Rouen duck is a very large breed of fine quality and good flavour, and carries a great amount of flesh. This breed fulfils the demand for large birds at the end of the year.

The Buff Orpington duck becomes more popular each year, as not only is it a prolific layer, beginning at the time when Aylesbury eggs are hard to get for sitting, but the ducklings are plump and fatten easily and quickly.

## GEESE.

**Housing.**—Geese do not require elaborate houses, all that is necessary being a roomy shed well littered with perfectly dry bedding. Good ventilation is essential, but draughts must be avoided.

**Feeding.**—For the most part the stock birds will feed themselves, if they can be turned on to good grazing land, but a little corn may be supplied in the mornings.

**Laying.**—After the morning meal the birds are best left in for a little while, so that any eggs laid will be deposited in the houses.

**Breeding.**—Immature birds must never be mated, and the best age for breeding stock is from two to eight years. Strong unrelated ganders should be used. As a rule three geese are mated with one gander, but the birds should be put together in the autumn if early eggs are required, as they take a long time to become acquainted. Very often geese will not breed at all during the first season unless put together early. For utility purposes a cross between the Toulouse and Embden varieties give the best results, using a gander of the former breed. As a layer the Embden is hardly so good as the Toulouse, but the Toulouse is not a reliable sitter. A young goose will begin to lay in her first February, but it is not a wise plan to set the eggs of young birds.

During the breeding season the birds must not be allowed to put on fat, but kept rather spare and in hard condition. All eggs should be taken away when laid, so that a large number may be produced. In selecting suitable stock for breeding, those which have a good length of body, well-set legs, and a wide breast, should be preferred.

## TURKEYS.

**Locality.**—The most suitable districts for successful turkey-breeding are those in which a rich but not a damp or heavy soil predominates, and where ample range can be supplied, bearing in mind the semi-domestication of the bird and its natural bent as a forager.

**Housing.**—An open-fronted house in which double doors (made of wire netting enclosed in wooden frames and opening outwards) can face the perches are the most suitable, the birds flying straight from the perch to the outer air. A smooth floor well littered, and a south aspect for the house are desirable factors, and the perches are best fixed from side to side.

**Feeding and Breeding.**—Overfeeding (during the breeding season in particular) is to be deprecated for stock turkeys; and if they are kept in lean, hard condition, hatching results should be good. Haphazard matings are rarely successful, and in the selection of birds, those which are of good shape, size, and balance, should be preferred. In turkeys more than in any other class of fowl, inbreeding results in delicate chicks which are hard to rear to maturity, and very much of the delicacy of the average turkey is referable to the use of inbred or immature parents. Two- or three-year-old birds are preferable to year-old, but where a young bird must be employed on one side, the cock may be the junior. Six or eight hens are usually put to a cock, and mating should take place in good time. Large-framed birds of sound constitution and vigorous habits, with straight breast bones and strong legs, make the best breeders, overfat or overheavy cocks being unsuitable for the purpose.

# CHAPTER II

## INCUBATION

Natural and artificial incubation—Modern combination of two methods—The brooding—Care and management of the sitting hen—Making the nest—Testing for fertility—Development of the embryo—Assisted hatches—Various types of incubation—General management—The moisture problem—" Dead in shell."

At the present date both the " natural " method of incubation, where the hens are permitted to hatch out one or more broods of chickens during the season, and the artificial one, in which eggs are incubated by heated machines, are being carried on side by side. It is not at all likely that the old method will ever be superseded entirely, even taking into account the great advances which have been made along artificial lines.

In the " sitting " breeds the desire is very strong, and even in the light Mediterranean breeds one sometimes comes across the maternal instinct, even though it be of a transitory nature. Undoubtedly by long disuse the faculty of brooding will atrophy, as witness the fowls of Egypt, in which country successful artificial incubation has been carried on by means of heated ovens for thousands of years, and where the fowls are all strict " non-sitters " in the extreme sense of the phrase. In this country, however, it is probable that both methods will continue to be carried on as at the present time, only that they will be used more and more to supplement each other's advantages and defects.

### NATURAL INCUBATION.

**Broodiness a Natural State.**—Even in the very large yards where incubators are of necessity used to turn out the immense quantities of chicks required, " broodies " will continue to be used, if only for the sake of the rest afforded to a heavy layer after a long winter's work, especially if the hens are allowed to rear at least one brood during the year. Where this is not possible, it is a wise plan to permit every heavy layer three weeks' rest on china eggs, in order that her egg organs may be relaxed, and that she may get through the moult at an earlier stage than she would do otherwise.

**To Encourage Broodiness.**—Where it is desirable to encourage or hasten broodiness, either for the purpose of profitably disposing of old hens during the early months of the year as sitters, or where a sitting of eggs needs to be put in hand at once, the hens required should be shut up in a dark, quiet nest-box and liberally fed on a carbonaceous diet, including maize, buckwheat, and hemp. A few days of the treatment will as a rule have the desired effect.

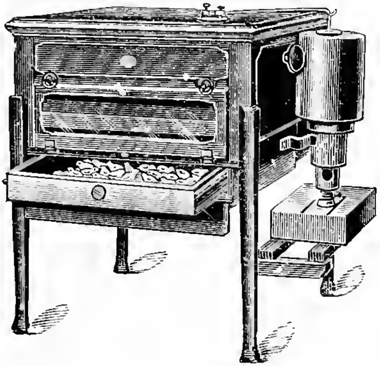

Fig. 6.—Hot-Air Incubator.
(Gloucester Incubator Co.)

**Test of Broodiness.**—Before setting a hen it is necessary to be quite certain that she is really desirous of her work. This is specially necessary when hens are being purchased from a distance or where they are being sent off on a railway journey, as the travelling frequently puts them off if they are not genuinely nest-ripe. It is a wise precaution, when hens have had a railway journey, to put them on china eggs for four or five days before entrusting them with valuable ones. If a broody abandons the perch for the nest-box at night, the sign is fairly reliable, but it frequently happens that if a hen is only half broody she will refuse to sit when put in the nest-box, or will forsake her nest after a few days. The ruffled feathers and characteristic "cluck cluck" are good indications of a real desire to sit, and if, when a hand is gently placed under the hen's breast as she sits on the nest, she settles down comfortably on it, spreading her feathers out widely, instead of standing up and fluttering, she is pretty safe as a sitter.

**The Best Type of Hen.**—All hens, even of the sitting breeds, are not good sitters; but one of these breeds should be selected, as the Mediterranean breeds for the most part, though they occasionally get a fit of broodiness, are not to be relied on. As good a cross as can be obtained is found in the Silkie-Wyandotte. This makes an ideal sitter, being very docile, not too heavy, and yet with plenty of fluffy feather. Very heavy hens are not advised, as they break so many eggs if they are at all clumsy. A nice medium-sized hen, with neat movements, plenty of "fluff," and having a quiet, docile disposition, is the ideal sitter. Restless, excitable fowls ruin many a sitting, and they will not bear the necessary handling. Dorkings are good mothers, as they stay with their chicks such a long time, and in the case of early broods this is important. Game fowls, too, make excellent mothers as a rule, while a Partridge Wyandotte we once possessed was the most perfect sitter we have ever known; but there are good and bad sitters in every breed. As a rule we prefer hens to pullets, the latter being more unstable, but many people use either indifferently. Only perfectly healthy fowls should be used as broodies, and if a hen goes off colour while sitting she should be removed.

It is an interesting point to note that hens which have been brought up entirely on the "scratching shed" system rarely make very satisfactory mothers, their scratching propensities being fraught with much peril for the chickens, as they indulge their proclivities for exercise very often at the expense of the lives of their offspring. This is at least according to our own experience with broodies brought up under such conditions.

**Insect Pests.**—Before setting a hen it is essential that she should be absolutely free from vermin, otherwise the torment she will endure on the nest may make her desert her eggs; and in any case the lowering of her vitality will render her unable to keep the eggs thoroughly warm, and a less successful hatch will be the result. A home broody should be above suspicion, and a dusting with pyrethrum powder ought to suffice in this case, but all hens from other quarters should have a thorough inspection and the powder well rubbed into their feathers. In addition to this, the nest-boxes should have a good disinfection and sprinkling with powder, and if an anti-vermin egg is placed in the centre of the nest the extra precaution will be found worth the cost.

**Eggs for Sitting.**—All eggs for incubation should be collected daily and carefully stored. In winter it is desirable to collect three or four times a day while the frosts last, or the germ within the egg may be destroyed.

All eggs should be as fresh as possible; and though eggs a month old, or even older, will hatch, it should be understood that the nearer the egg approaches to the "new-laid" the better are its chances of hatching. When set from home stock, their quality should be above reproach, as they should be marked with the date before storing, so that they can be used in rotation. They can either be placed on their sides in bran or in a rack, when they must be turned every day to prevent the germ from adhering to the side of the shell. Some authorities recommend their being placed with the large end downwards, others advise its being at the top. The former method is probably preferable, but the latter is more convenient. A simple method is to store them in travelling boxes, when they may be turned daily *en bloc*. They may thus be put up in cletches, in a convenient form for handling, the date of laying being pencilled on the box. The old idea that the long, narrow eggs contained the cock birds and the round ones the pullets has been exploded long ago, but in selecting eggs for sitting, preference should be given to those which are of moderate size, neither too large nor too small, of normal shape and smooth shell, abnormally-shaped eggs or those with rough shells being rejected. Eggs which have come from a railway journey ought always to be rested for twenty-four hours before being set, and the place where incubation eggs are kept should be free from draughts and vibrations, and not cooler than 40° in temperature. Before finally putting the eggs under the hens, it is wise to draw a ring round them with blue pencil, so that if any are laid in the nest, as sometimes happens, they can be at once removed.

**The Sitting-Box.**—It is usual to term hatching under hens "natural"; but, when one comes to think of it from the hen's point of view, it is highly artificial to take her from the nest she likes (and which her owner probably does not like) and shut her up in a wooden box. Consequently, though from a utilitarian point of view it is quite out of the question to allow a hen to pick her own nesting-place, every effort should be made to adhere to natural conditions as far as possible, and removal to the made nest should take place as gently and as soon as can be. Where only a few hens are being used, the common orange box is not to be despised, as it makes quite a good nest, and, being so cheap, can be burnt after use, thus avoiding the annual disinfection otherwise necessary.

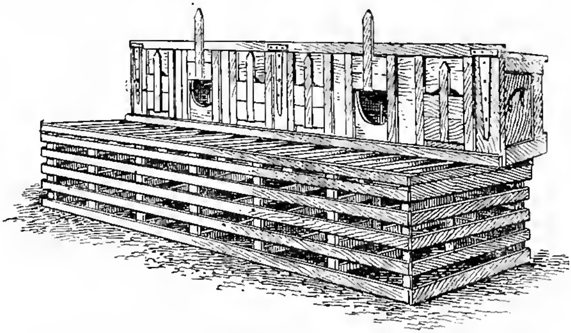

FIG. 7.—SITTING-BOXES AND RUNS.
(Hebditch.)

Any ordinary wooden box will answer the purpose if one side is knocked out, so that the nest rests on the ground, and if a piece of board three or four inches high is left on the front so that the straw will not fall out.

Where many hens are set, however, these rough and ready arrangements will not do, and those poultry-keepers who work on a large scale usually fit up a shed with nests and runs, so that the hens are all together. Sheds like this should be kept fairly dark, and ample ventilation be provided. In the warm weather it is not a bad plan to let the hens sit outside, provided the front of the box is wired in to protect its occupant from vermin. Where the nest-boxes are indoors, they should not rest on a wooden floor, but should have a square of turf to keep the nest damp.

**Tethering Hens.**—When hens are set outside, the usual gamekeeper's plan of tethering each hen to a peg driven into the ground, by means of a swivel and rope, is adopted. The hens can thus obtain exercise, and are yet prevented from going back on the wrong nest or fighting with neighbours.

**Nests and Runs.**—The majority of appliance-makers manufacture at a fairly low cost ranges of sitting-boxes, with a small run attached, so that each fowl is confined to its own quarters and there is no possibility of mixing. The nests should be of a simple pattern, and easily accessible to the attendant. A deep coop with a small door makes the attention to the eggs very difficult.

**Making a Nest.**—The instinct of the hen is to choose a secluded corner where she can scratch out a hollow and deposit her eggs on the bare ground. Following out this idea, the man-made nest should rest on an earth bottom, either simply a shovelful of fine mould or a square turf beaten down in the centre to form a cup-like hollow. Shaping the nest is a matter of some importance, as if the hollow is too shallow the eggs roll out, and if it is too deep they lie in a heap, and some will certainly be broken.

There must be no corners in the nest, or the eggs will roll into them and get chilled, and the lining of straw or hay must be well worked into the corners by the hand. Straw is less liable to harbour insects, and in summer affords more ventilation than hay, but the latter is to be preferred in winter. Clean, sweet nests are important, and should be inspected each day, and fresh litter being supplied if necessary.

**Moisture.**—There is no need to supply moisture if the turf is put in, unless very dry east winds prevail, when it can be wetted with tepid water towards the end of the hatching period.

**Settling the Broody.**—Hens are all more or less nervous and excitable, and should be handled as gently and quietly as possible. It is well to put a broody on her eggs at night, when she is more tractable, and as a rule, if she is put down gently in front of the nest, she will walk straight on to it and settle herself; or, if she is already sitting on china eggs, they can be withdrawn one by one, and the real ones slipped underneath her.

**Daily Management.**—When the hen is settled with her eggs, her daily life should proceed as regularly and quietly as possible. Once a day she must be allowed off for a sufficient time to feed, drink, and take exercise and a dust bath. As far as possible, the attendant should make the round of the sitting-boxes at the same time every day. Any irregularity in visiting them causes restlessness and a tendency to stand up on the nest, when the eggs may get chilled.

Very often a zealous sitter will refuse to get off the nest at the beginning of the time; but this should not be encouraged, and those hens which will not come off their eggs should be gently lifted off and placed within reach of food and water. If left alone they will get into poor condition, and the eggs will not get sufficient cooling. When lifting a hen off the nest, raise each wing in turn to see that no eggs are underneath them; then put the hand under her breast, and lift her gently out, taking care that the hen's legs do not sweep any eggs out of the nest as she is being withdrawn on the hand of the attendant.

**Cooling the Eggs.**—The length of time that the hen should be off the nest varies very much with the time of year and the state of the weather. Fifteen minutes to thirty minutes may be taken as the minimum and maximum, though it is often difficult to make a very keen sitter stay off her eggs fifteen minutes, and, on the other hand, it is not to be supposed that eggs will not hatch even after a prolonged absence from the nest. Beginners usually err on the side of giving the eggs insufficient cooling, but we do not advise longer than thirty minutes at any time of the year. If a hen shows no disposition to return to her nest, she should be quietly coaxed and driven towards it, but not hurried or frightened in any way. If possible, it is well to avoid lifting a hen back on her nest, as some of the eggs usually get broken.

**Food and Water.**—Sitting hens do not need soft food, and one meal a day of hard grain, that being of a carbonaceous character, will suffice. A mixture of wheat and barley, with maize three times a week in addition, is the most suitable food. Fresh water must be supplied once a day, and sharp flint grit is specially needful for the sitting hen, as she is unable to obtain it for herself.

**Dust-Bath.**—This, too, is of great importance, as no hen can be a good sitter if she is infested with insects, and also her chickens, when hatched, will become infested too. The dust-bath will be much appreciated, and should be of dry earth or ashes, with insect-powder liberally sprinkled in it.

The hen must never be allowed to go back on the nest until she has performed her evacuations, or the nest will be soiled.

**Broken Eggs.**—If by any chance an egg should be broken in the nest, the soiled litter should be removed, all the sound eggs removed to a place of safety and covered with a piece of flannel, clean straw put back in the nest, and any dirty eggs well sponged with warm water, dried carefully but quickly with a cloth, and put back with as little delay as possible. The hen's breast must also be cleansed and dried, or some more eggs may stick to her and get broken. Dirty eggs must always be sponged, or the pores of the shell will get blocked up and the respiration of the developing embryo will be hampered. If an egg is merely cracked, a strip of paper pasted over the place with white of egg will usually serve to protect it until hatching time.

**Number of Eggs to Sit.**—The number must, of course, vary with the time of year and the size of the hen, but it is always wise to bear in mind that the chickens have to be kept warm after they are hatched, and that a hen which could cover fifteen eggs comfortably could certainly not brood that number of chickens successfully in cold weather. It is a common mistake to put too many under a hen, and personally we do not advocate more than thirteen even for a large hen, while in the autumn, winter, and early spring, six to nine eggs should not be exceeded.

**Continuous Sitting.**—The practice of allowing a hen to incubate entirely two sittings of eggs in succession is not to be commended, as the strain of six weeks' close sitting is too much for the vitality of the hen; and her bodily heat being in consequence much reduced, the eggs incubate too slowly. This does not apply, of course, to cases where a hen merely starts a sittting, which is afterward finished off by the incubator, allowing her to proceed with another batch of eggs, as in that case the sitting period is only reasonably long.

It is wise to set three hens or more at a time, and when testing for fertility on the seventh or eighth day to divide up the fertile eggs among two of the hens, giving the third one a fresh batch to commence with again.

**Variations in Bodily Temperature.**—The temperature of different hens varies very widely, hence the wisdom of only permitting one hen to attach herself to one sitting of eggs. As incubation progresses, the embryo begins to generate heat of its own, and the gradual increase of temperature in the eggs is balanced by the proportionate decrease in that of the hen's body, ideal conditions including this delicate natural adjustment. It is easy to understand, therefore, that any change of broody would be harmful to an advanced sitting of eggs, especially when it is remembered that, according to actual readings, the temperature of five sitting hens selected at random has been found to vary from 98° to 105°, neither of the extremes giving such good hatching results as those of hens whose temperature readings were between these two points.

**Testing for Fertility.**—It is usual to test on the seventh and eighth day, and again at the beginning of the third week, of incubation, and the necessity for accurate and regular testing is obvious. Unfertile eggs can be removed and some of the hens started afresh, and the unfertiles themselves used for cooking or for sale at a low price to photographic paper makers, or where the quantity is small they can be utilized in making custard for the young chickens. Addled eggs, if not removed, are a source of danger to the developing embryos, owing to the impure gases which escape through the pores of the shells. Testing eggs is best done at night, and is accomplished by means of a lamp made specially for the purpose, giving a strong light through an opening covered over with transparent material, so that the heat from the flame cannot injure the egg placed before it. By holding an egg up to the opening of the lamp in a dark room, the appearance of the embryo can be distinctly seen as a dark spot with radiating threads having somewhat the appearance of a spider. In very thin-shelled eggs, and when the germ is very strong, the embryo can be detected even at the third or fourth day, but by waiting till the seventh or eighth there is no possibility of mistake. It is best for the beginner to try white-shelled eggs before brown ones, and an Aylesbury duck egg is the best of all, as, being extremely transparent, the embryo within is beautifully visible. A dead germ is light in colour, and if putrefaction has begun shows cloudy against the light. A broken yolk will show as an irregular red line against the light, and an unfertile egg having no impregnated germ within it will appear clear and unchanged.

At the eighteenth or nineteenth day of incubation the live chick appears as a dark mass, with a clearly-defined air space in the egg chamber.

**Testing by Immersion.** — The water test is an old-fashioned and, in our opinion, an unreliable one. Unneeded moisture is supplied in the first case, and in the second case a strong chicken might be thrown away as a dead germ. The eggs which float on the top of the water are held to contain the live chicks, and those which sink dead germs or dead chicks; but suppose that a chick has reached the stage of development where its beak is about to pierce the membrane of the egg chamber, such an egg would sink almost certainly, even though the chick was perfectly strong and well developed.

**Development of the Embryo.**—The gradual growth of the chick within the egg chamber by means of the warmth afforded by hen or incubator is extremely wonderful, and commences within a few hours of incubation, segmentation, as a matter of fact, being brought about even before the egg is laid, owing to the natural warmth of the hen, but remaining arrested until incubation is once more commenced by the " broody."

The blastoderm, or germ-spot, expands considerably even during the first day. From the first to the fourth day the head, the optic nerves, and the vesicles of the brain, develop, together with the digestive canal, kidneys, liver, and pancreas. By the end of the fifth day the arteries have begun to form, nourishment is absorbed from the blood, and a rudimentary respiration begins. From the fifth to the ninth day the spinal cord, the thoracic cavity, and the pelvic girdle, are evolved, and on the tenth day the growth of down and feathers is begun. On the fifteenth day the beak is fully formed, and from that day gradually hardens (along with the development of the other parts of the body), till on the nineteenth day it is ready to pierce the air chamber, when true respiration commences. The whole structure then proceeds to develop rapidly, the yolk (which has been affording nutriment to the developing bird from the beginning of the process) is passed into the stomach, and the twentieth or beginning of the twenty-first day finds the perfected chick breaking the shell.

**Hatching.**—As soon as chipping has begun the hen should be fed on the nest, and not allowed to come off, any chilling to the eggs being particularly harmful at this time. The golden rule is to leave well alone, interfering as little as possible except by the clearing away of the eggshells with a gentle hand from time to time. Otherwise the hen should be left in peace to finish the hatch, and then given another feed on the nest. The coop should be prepared for her occupancy, but she should not be moved for twelve hours after the last chick is out—that is, until they are all perfectly dry. For treatment of newly hatched chickens the chapter on Rearing gives full directions.

**Assisted Hatches.**—These are seldom successful; and though the beginner is always anxious to help chickens out of the shell, it is only really permissible where a strong chicken has obviously got into difficulties, or where the head has been presented at the small end of the shell. In nine cases out of ten a chicken which is not strong enough to get out of the shell itself is not worth its salt, and should be left to its fate. Assisted hatches *usually* mean the survival of the unfit, and ailing chickens which have to be coddled through life are of no use of the utility poultry-keeper.

**Eggs of Other Fowls.**—The Aylesbury duckers generally use a large number of hens to incubate their duck eggs. The only difference in treatment is that the duck eggs require more moisture than the hen eggs, and that their time of incubation is longer—twenty-eight days. Hens are generally used to incubate goose eggs early in the season, and not more than five eggs should be put under a hen. Thirty days is their usual time of incubation.

The turkey hen is a marvellous sitter, and in France is used as a kind of incubator, bringing out batch after batch of chicks. They are generally allowed to incubate their own eggs in this country, and a good-sized turkey hen will cover sixteen to eighteen eggs. Twenty-seven and twenty-eight days is the time reckoned for hatching.

## ARTIFICIAL INCUBATION.

**Advantages of Incubation.**—The vast strides which the poultry industry has made of late years is undoubtedly due in a large degree to the perfection of methods of artificial incubation (and rearing). Where thousands of chicks are turned out for the day-old chick trade, or where large quantities of early chickens are desired, the incubator is an absolute necessity. Incubators are much cheaper than they were, and once the original cost is surmounted, the cost of working, even with the best oil, should not amount to more than a penny per chick, and as far as increased profits are concerned an incubator will soon pay for itself. If a good machine is obtained and directions well carried out, the oft-repeated statement to the effect that incubator chickens are less healthy than naturally hatched ones would seem to be without foundation, though we must confess that for our own *stock* birds we prefer to use those which are hen-hatched. An incubator is ready for work all the year round, when broodies cannot be obtained, and as far as mechanical perfection is concerned it would seem that it had every advantage over the frequently blundering and clumsy hen; but it is nevertheless a curious fact that the hen can hatch many eggs which no incubator ever built could have done, and in all probability the best plan is to combine the advantages of the two.

**Hens and Incubator in Combination.**—Where the hen scores is during the first ten days of incubation, as any doubtful eggs appear to get a better "start" with her than they do with the machine; but where the latter scores is during hatching time, no chickens being lost through crushing and trampling, as is often the case with hens. Again, an incubator, even a large-sized one, will take up far less room than the number of broody hens required to hatch a similar quantity of eggs; and when the unfertiles are removed from broodies started at the same time as the machine, the fertile eggs can all go together into the incubator and be finished off in them, while the hens have a new lot of eggs supplied to them. In this way both hens and machine can be made to do double duty. If it is desired to let the broody sit out her full time, the eggs can simply be taken away from her on the nineteenth day, and allowed to come out in the incubator drawer.

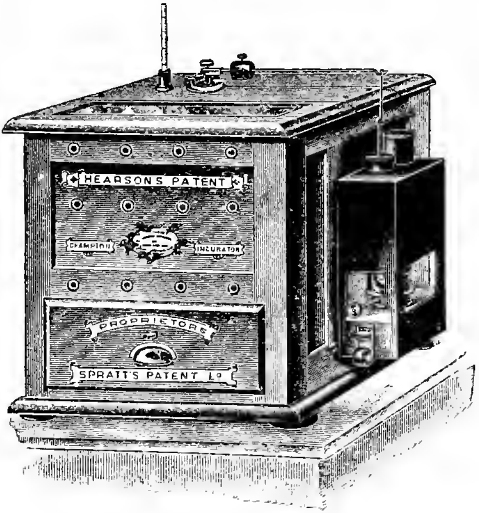

Fig. 8.—Hot-Water Incubator.
(Spratt.)

**Types of Machine.**—The variety of incubators now on the market is almost endless, but for the most part, if we except the newest type, the electric incubator, they resolve themselves into two types—the hot-air or the hot-water machine.

**Hot-Water Machines.**—Hearson, as is well known, was the first really successful maker of the tank machine, owing to his introduction of the famous thermostatic capsule, which, with varying modifications, is found in most of the hot-water machines of to-day. This capsule is composed of two pieces of metal soldered together at their edges, and contains 20 drops of a fluid which is known to boil at a certain temperature. The capsule expands with the heat, and by means of a connecting rod raises a damper which permits the escape of the surplus heat. This extremely sensitive regulation gave the Hearson machine a supremacy in the beginning of artificial incubation which it has never lost, though many makers, such as Phipps, Tamlin, and others, have made excellent machines of a similar nature.

**Hot-Air Machines.**—In America the hot-air machine is far more generally used, and the "Cyphers" incubator may be taken as a specimen, or the English "Gloucester." In these the thermostatic capsule is replaced by double thermostatic bars of metal which are sensitive to heat, and expand and contract in accordance with the temperature.

**Comparison of the Types.**—There is very little difference between the two types as regards the distribution of heat. In the tank type the ventilation is provided in the shape of holes evenly distributed over the bottom, the air filtering through a piece of canvas, which is kept wet by the water in the water tray.

It is claimed that in the hot-air machines the incoming air is warmed and distributed so uniformly and slowly that all draughts are avoided, and from that point of view they might be considered superior to the tank machines. They certainly economize oil more, and the fact that there is little or no need to apply moisture is a point in their favour. They are distinctly more sensitive and quick in responding to changes of temperature, and this may constitute a grave danger if perfect attention is not given to the lamp, which can never be left with safety as long as that of a tank machine.

On the other hand, the body of water in a tank machine (though it certainly takes a little time to get up to the required temperature) will maintain the temperature steady for some time, so that even if the lamp were to go out the latent heat in the water would keep the egg chamber from getting cold for several hours, thus preventing fatal results. It follows also, that heating by hot water tends to prevent fluctuations and sudden rises in temperature. Capsule machines are, however, very sensitive to changes in the barometer; and a capsule thermostat should never work unchecked by a barometer in addition to a thermometer in the incubator room.

**Small and Large Machines.**—Provided a good make of incubator be obtained and the directions of the manufacturers followed, it would seem that there is little importance in this question; but our own practical experience is that the medium-sized incubators are more reliable and work better than either the extremely large or the very small sizes, and on comparing notes with several large breeders; we have found our own opinion corroborated. We do not attempt to explain this curious little fact, but only state it according to our own experience.

**General Management.**—Having chosen a reliable make, the instructions given by the maker must be observed, by the beginner at least, very thoroughly. It is all very well for experienced workers to slightly alter directions, but for amateurs the strict letter must be carried out. Each incubator has its own little peculiarities, which can only be found out by practical working. The incubator should always be carefully levelled, as this will help to keep all the corners of the egg drawer at a fairly uniform temperature and will assist the lamp flues in working properly.

**The Room.**—A suitable room is an essential for successful working. It must be quiet, airy, and dry, with a well-fitting door and good ventilation, and free from noise, jar, and vibrations, as these will cause death or deformities. A stove or brick building (or, better still, a half-cellar) is the most suitable of all. The half-cellar is better than a room entirely aboveground, as it is less likely to vary in temperature, whilst a room entirely underground, unless specially drained, is apt to be damp. A brick building, with a good roof, sound floor, and with plenty of ventilation, should answer the purpose very well. A glass building is the worst of all, as it is quickly heated or cooled; and whilst air is desirable, it is not wise to put incubators just under the draught of a window. All air must be pure, as the developing embryo needs oxygen, and all smell of oil must be avoided.

**Thermometers.**—These should always be kept in the paper tubes provided for their safety; and when the drawer has to be opened or the thermometer read, it should only be pulled out enough to take the readings. When not in use, thermometers should be kept in their own tubes in the

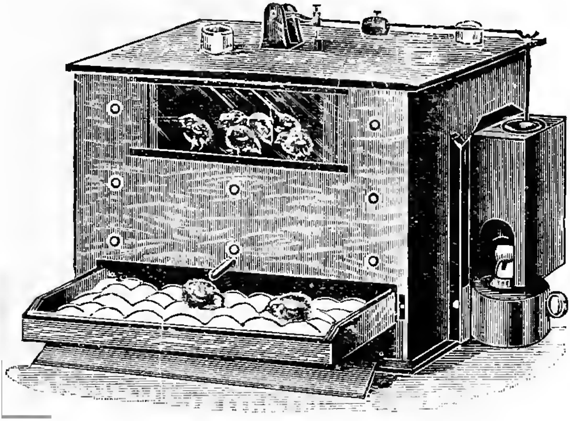

Fig. 9.—The "Times" Incubator.
(New Poultry Syndicate.)

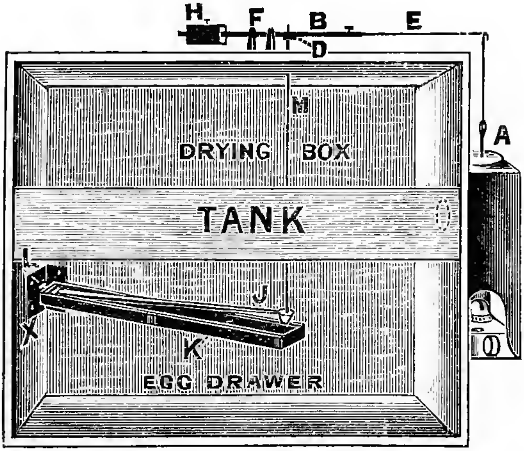

Fig. 10.—Section of Same.

egg drawer, and a spare one should be on the premises in case of emergency. It is not necessary to test thermometers before using, as appliance-makers test thoroughly; but if things go wrong unaccountably, it is a wise precaution to compare the thermometer with another one by putting them both in warm water. Before opening the egg drawer always take a reading of the thermometer, as it is of very little use to take one unless the drawer has been closed for quite three hours previously.

**The Lamp.**—Care must be taken of the wick, to prevent smoke, and a daily rubbing down of the corners with a stiff piece of paper is better than too much cutting. When it is necessary to trim it, the corners should be cut down so that no "tails" can occur. Only the best American kerosene should be used, and cheap oil is a dangerous and troublesome investment. See that the glass chimney covering the lamp comes into close contact with the bottom of the lantern flue, or draught and "flare" will both result. It is necessary also to note that the perforated screen under the cone of the burner does not get charred with carbon refuse from the wick. If the holes get stopped up, they should be scrubbed with a small brush, as otherwise the flame cannot get enough air. Tank machines are more liable to sooty flues than the hot-air kind, and this point must be carefully watched. To test flues for smoking, hold a lighted match over the return flue; and if the flues are clear the match will immediately go out, but if they are full of carbon refuse the match will continue to burn brightly. Never turn the eggs after trimming the lamp, or the pores of the shells may get blocked with carbon refuse from the fingers.

**Cleanliness.**—Between each using the incubator should be well scrubbed out with Izal and water, including the egg drawer, and (if a tank machine) the water tray and canvas, to prevent the appearance of mould and bacteria.

Any soiled eggs should be wiped over with Izal and water, and addled ones at once removed on account of the noxious gases arising from them.

**Eggs for Incubation.**—These should be under a week old whenever possible, as an incubator is not so successful with stale eggs as a hen. In any case they take longer to hatch than fresh ones, and protracted hatches are rarely very successful. Eggs in winter should be collected frequently, for fear of frost getting to them, and should be stored in a cool, quiet place. Only normal eggs should be set, and those from reliable stock birds.

**Incubator Charts.**—These are essential, and if properly entered up they are very valuable for future reference. The printed ones are the best, in which the name of the incubator, the breed, the number of eggs put in it, and the date when started and when hatching is due, the number of fertile, broken, addled, and hatched eggs, etc., can all be entered. The temperature of the room, of the egg drawer, and of the outside air, as well as of the moisture in the atmosphere (to measure which use a hygrometer), should all be entered in the double-ruled columns provided for the purpose of entering details of the morning and evening visits to the incubator room.

**Temperature.**—As far as possible, an absolutely regular temperature should be maintained in the egg drawer. To variations in this are due deaths in shell and deformed chickens, and a too high temperature is more likely to cause a poor hatch than a too low one. The theory of *absolute* regularity is, however, rarely attained either by hen or incubator, but as little variation as possible should be aimed at. The following table of degrees of heat is a generally accepted one :

| | | | | | |
|---|---|---|---|---|---|
| For a room | at | 50° | keep incubator | at | 105° |
| ,, | ,, | 60° | ,, | ,, | 104° |
| ,, | ,, | 70° | ,, | ,, | 103° |

A room of 50° is, however, to be avoided, and 103° is generally accepted as being the best working heat. Of course, at the tenth or eleventh day the chick begins to generate heat of its own, and the stronger the bird is the higher will the thermometer read, till later in the hatch the difference may be as much as 4°. It must not be assumed in a case like this, where the temperature gradually rises, that anything is wrong with the regulator, and the heat can be easily combated by lowering the flame of the lamp or gas.

As far as possible, it is well to avoid touching the regulator itself during a hatch, unless the turning down of the lamp has no effect in reducing the heat. Excessive heat is very harmful indeed, especially during the first few days of incubation, but a good brisk heat should be maintained when the eggs are just chipping to bring off a good hatch ;

and while the eggs are hatching avoid opening the drawer more than can be helped, or the temperature will rapidly fall, and a chill at this time is very harmful.

No hard-and-fast rule can, however, be laid down, the make of machine and the position of the thermometer in the drawer altering the case very much, while the number of infertile eggs affects matters considerably. As an average, however, we may take the best temperature of the actual eggs at the beginning of the occupancy to be 102½° to 103°.

**Moisture.**—In a normal egg there is sufficient of this to incubate, provided that the ventilation of the incubator is good enough to prevent undue evaporation. In tank machines the water tray is necessary for the supplying of moisture, owing to the means of ventilation provided (*i.e.*, by direct openings), as the rapidity of evaporation is in proportion to the rate of the air movement and the moisture of the air surrounding the egg chamber. Excess of moisture, it is necessary to point out, is just as harmful as lack of the same, particularly during the early stages of development. A number of experiments have been carried out in this country and in the United States of America to discover what degree of moisture exactly gives the best results; but at present no definite discovery has been made, the type of machine, the state of the weather, and atmospheric conditions of the room, all being factors which have to be considered. When high east winds prevail, slightly more moisture should be given, even to hot-air machines, which are considered to require none under ordinary conditions. In the tank machine the temptation is to overdo moisture; and while with a low temperature this is not of much importance, with a high one it is absolutely fatal. Manufacturers advise the filling of the water tray from the very beginning, but we have personally had better results with it only half full for the first ten days. The test we have found most reliable as to the quantity of moisture which it is right to supply is to set a batch of eggs under a hen (under natural conditions as nearly as possible), and at the end of every few days after the first ten days to compare the air spaces in both lots of eggs. If these coincide, it may be taken that the right amount of cooling and moisture is being supplied. If the hen eggs show much larger spaces than the machine eggs, it shows that the machine eggs are having either too little cooling or too much moisture, and *vice versa*.

**Testing.**—This is even more important in incubator work than in natural hatching, as several unfertile or addled eggs in a drawer may affect the temperature of the others very materially, and the addled eggs in particular may, by the gases they give off, do serious damage to the others. The seventh or eighth day, and, again, the fifteenth, will be found the most suitable times for testing for fertility.

**Cooling.**—Cooling, like moisture, can be overdone, but it must be remembered that in very cold weather it takes the machine longer to warm the eggs up again to their former temperature than it does a hen. In the majority of cases, however, the danger lies in the eggs getting *insufficiently* cooled, and this seldom results in a good hatch of strong chickens. In a warm room it is only necessary to cool while turning, for the first week, and, after that, in cold weather they should be cooled in the morning for about ten minutes, in warm weather from fifteen to twenty minutes, while at night it is only necessary to give them the cooling they get while being turned. When the first egg is observed to be chipped cooling should cease.

In hot-air machines, with a room temperature of about 50° and a working temperature of 103°, cool from fifteen minutes the first week to twenty the second and third.

**Turning.**—It is necessary in incubator work to turn the eggs twice daily, in order that the germ does not stick to the side of the shell, and in order, also, that the eggs may vary their position in the drawer, as, although in theory all parts of the incubator drawer are supposed to be of equal temperature, in practice the centre of the drawer or one of the corners nearest the lamp is usually much hotter than any other part.

When turning the eggs in the morning, a few should be taken from the centre, which will cause the top ones to roll gently down to fill their place, and the first ones taken out can be put in the corners. In this way all the eggs will be shifted in position daily.

The egg drawer should be left open in the morning for the necessary cooling, but at night the eggs are simply turned. When working in a very hot room (to be avoided if possible, it may be necessary to turn the eggs thrice daily. Eggs should never be turned with cold hands, and should be moved gently without jarring. On testing days it is not necessary to cool or turn the eggs, as they get quite enough handling while being tested. After the eighteenth day eggs should not be turned, and on the last morning place the big end of the eggs slightly lower than the small end, so that the chick (which turns completely round in the shell on the nineteenth day) avoids the danger of jambing the head, which often ensues if the egg is resting on its small end.

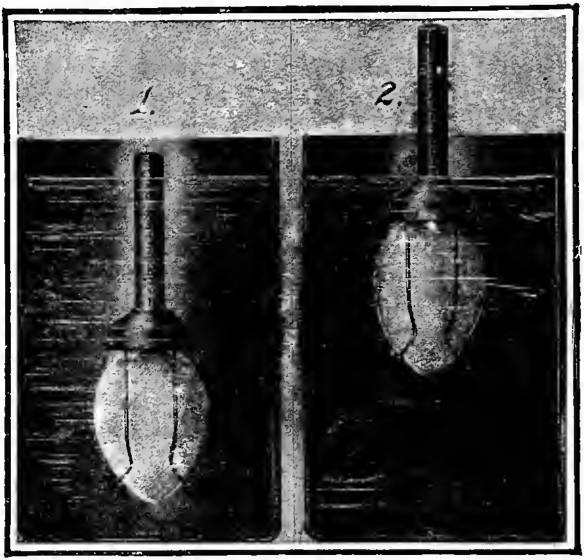

Fig. 11.—Egg-Tester.

(Toope.)

**General Working.**—The incubator should always be working at a regular temperature for a couple of days before the eggs are put in. Never pack the eggs tightly together, they are much more difficult to handle and the eggs hatch better when the drawer is not quite full, as the developing embryo can draw upon a purer supply of oxygen. It is best to put all the eggs in together for general convenience of working ; but if any have to be added, a strip of flannel folded and warmed should be placed between them and the other eggs. If eggs are chipped, do not interfere with the machine, and avoid assisted hatching whenever possible. Regularity in attending to the machine is essential, the lamp being filled and trimmed daily, the thermometer readings carefully taken, the cooling and turning not forgotten, and the temperature maintained at an even level. Do not expect too much of the machine, for, since its capacity is about five times that of a hen, a much larger number of unfertiles, deaths, etc., may be expected ; and while many people get hatchings of 90 per cent. from their machines, 70 per cent. may be considered a very good average.

**Hatching.**—If instructions have been carried out and strong fertile eggs have been used, the chicks should begin to chip the shells on the twentieth day, and make their appearance unassisted twelve or eighteen hours afterwards. When the eggs begin chipping, keep the drawer closed as much as possible. If a shell should be chipped on the lower side, turn it round so that the chick can get out. If the chick breaks the shell at the small end, or if the shell is impeding the breathing, it is permissible to offer assistance, but obvious weaklings are best left alone.

Chickens fairly out of their shells should be transferred to the drying box, its zinc bottom being well littered with peat moss, as the air in the egg drawer will be too hot for them. If only a few are in the box at a time, the glass lid may be kept shut ; but if a great many are in together, the lid should be slightly raised, putting a piece of flannel across, and in three or four hours they will be dry and fluffy.

**Common Causes of Dead in Shell.**—" Dead in shell " is, unfortunately, a very common trouble in incubation work, and among the causes are—using eggs from parents that are inbred, too young, too old, very fat or badly fed, over- or under-mated ; using eggs that have been chilled or overheated ; supplying too much or too little moisture in the incubator, the air being too damp to dry out the air cell, or so dry as to dry up the membrane. Even with the greatest care, it is not always possible to avoid this in incubator work, whereas with hens the trouble is distinctly less, and we are coming to the conclusion, suggested long ago, but never really debated, that the difference lies in the protective covering of oil which comes from the breast of the hen and envelops the eggs, thus acting as a kind of lubricant to the important membrane of the egg chamber. An incubator cannot supply this, and, though the suggestion may seem absurd to some people, we are inclined to think that by wearing a pair of slightly greasy gloves when turning the eggs (provided the grease is of a clean, odourless nature) the same effect might be produced. There is certainly a great difference in the *feel* of incubator eggs and hen-brooded ones towards the date of hatching, and we venture to suppose that the lack of this protective covering, slight though it is, is the main reason for the excess of "dead in shell" in incubator-hatching as compared with hen-hatching.

**Hatching of Other Eggs.**—Duck eggs are being hatched increasingly in incubators by large duck fatteners, and their general management is pretty much the same as the eggs of the common fowl, except that the incubator needs to be worked 2° lower in machines of the tank type, and ½° to 1° in hot-air machines. Ventilation must not be of too rapid a nature, and more moisture must be supplied. Ducklings are slower in getting out of the shell than chickens, but are strong and vigorous, and can be assisted out without danger of injury. They do best when hatched alone, not mixed up with fowl or other eggs. A strip of flannel wrung out of hot water and laid over the eggs for a few minutes two or three days before hatching will assist matters considerably.

**Cleaning Machines.**—After the incubators are finished with for the season, they must be carefully disinfected, and, if tank machines, emptied of their water and allowed to dry. Hot-air flues and radiating chambers must be cleared from soot, or it may eat the metal away. Spare parts should be overhauled, thermometers packed carefully away, and lamps taken to pieces and cleaned, while water trays and coverings should be thoroughly boiled and dried to prevent the bacteria which may have been introduced from remaining active.

## CHAPTER III

## REARING

Natural methods: First meals — Various foods — Feathering — Insect pests. Artificial methods: Warm brooders, houses, and rearers—Management of same—Cold brooders—Separation of the sexes.

THE chicken rearer of to-day has a far simpler task to face than was the case a few years ago.

With the increasing importance and development of the business has grown up a vast number of improvements in matters of feeding and housing, together with a much wider and more scientific knowledge of the theory of rearing. The old-fashioned haphazard methods are abandoned, and it is recognized that, when chicken-raising is to be entered upon as a business, business training and business methods will have to be adopted.

Of course there are faddists and extremists in every branch of industry, and chicken-rearing forms no exception to the rule. The wise man will refrain from adopting every new idea and hasty theory until the tests of practical experience have been applied, but will, on the other hand, avoid any cast-iron system, having the open mind and capacity for seeing both sides of a question. It is not easy to go astray if the requirements and necessities of young chickens are looked at in the light of common sense, and there is no branch of the poultry industry which presents more fascination in itself.

It must be noted that there are two distinct styles of rearing in vogue at the present time: one, the natural method of rearing under a hen; the other, the artificial, by means of either a heated brooder or of the newer type of "fireless brooder." Each method has its own advantages and disadvantages, and, since the two styles demand somewhat different treatment, it will be of advantage to treat them separately. Undoubtedly, the great strides which the poultry industry has made during the past few years is largely due to the adoption of the artificial system of hatching and rearing. The early spring chicken trade has been much helped, since the chickens can be put on the market exactly at the most profitable time. The labour of looking after half a dozen brooders, each holding from 50 to 100 chicks, is infinitely less than that required to attend to the wants of the requisite number of broody hens. It is a curious fact that hens often bring off the best chickens, whilst brooders make the best rearers. Brooder-reared chicks are freer from insect pests, and so have the chance of making better growth; are more under control, and can be kept from marauding vermin; there are no trampled chicks; and, provided perfect cleanliness, proper feeding, and ample ventilation, are arranged for, brooder-reared chicks are perfectly healthy and strong. On the other hand, the beneficial effect which a spell of sitting and rearing has upon hens must not be forgotten, and it is often advisable for heavy layers to be permitted to indulge their natural proclivities. Many hens make admirable mothers, and for the poultry-keeper who only intends to rear a few batches of chickens there is the question of the expense of a brooder to be considered. It is highly improbable that the natural method will ever be abandoned, some of our largest farmers—both exhibition and utility—giving it as their opinion that the best results are obtained by the use of both methods in combination.

## NATURAL REARING.

**First Meals.**—Once more the axiom must be stated that it is quite unnecessary, and, indeed, absolutely harmful, to feed chickens for twenty-four hours after emerging from the shell. Nature has provided for the chick for that length of time by means of the yolk within the egg from which the chick is hatched, the yolk being absorbed into the stomach of the chick the last thing before hatching, and digested after its arrival in the world. A longer period of abstinence from food is even advisable, thirty-six hours being really the most suitable time. Some authorities recommend giving no food for an even longer period, but we are not in agreement with them.

The hen, however, should be fed on the nest as soon as the hatch is over, letting her have a liberal supply of corn so that she will settle down comfortably and not get restless. A good feed for the mother consists of wheat which has been mixed in a hot mash, and then allowed to cool, when it will be found to have slightly swelled. Water should be supplied, too, but many hens will not drink on the nest.

**Coops.**—The next matter is the removal to the coop, which should not take place for twenty-four hours or so after the hatch and which in damp or cold weather must be carried out carefully, since a chill contracted by the chickens at this period has a most injurious effect. Unless the weather is exceptionally wet and stormy, or the month of the year very early, we think it wise to put the chickens out into the open as soon as possible, as they seem to do so much better than when kept under more artificial conditions. If the weather is bad, the coops may stand under a dry shed or outhouse (preferably one with an earth floor), from which the youngsters can venture out in search of fresh air and exercise. All coops should be strong and well made, and those intended for winter use constructed of good solid wood. The large-sized ones are most suitable, and wherever possible a sloping roof, projecting a little over the front to carry off the rain should be provided. A more expensive type, but a very excellent one, has two compartments—one in which the hen is confined, the other with an open front of netting, serving as a covered run for the chickens, and having a sliding panel across the front, which can be adjusted according to the state of the weather.

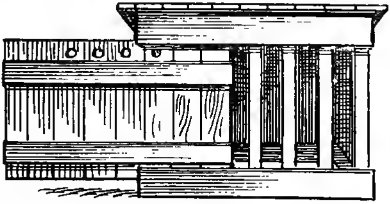
FIG. 12.—COOP WITH DOOR.
(Toope.)

Many makers build the coops with adjustable shelter-boards, which are hinged and let down right over the front of the coop, so that the coop is completely shut in for the night. In many districts this is absolutely essential, so that field vermin cannot enter; but care must be taken that the ventilation holes are sufficient, since nothing can be worse for chickens than to sleep in a stuffy, badly ventilated coop night after night.

The late Mr. Lewis Wright gave it as his opinion that wooden floors for coops were advisable unless the coops were removed every day to fresh dry soil, although, he added, where this could be done no better plan could be adopted. We hesitate to put forward our views in opposition to so recognized an authority, but, speaking from our own experience, we absolutely taboo wooden floors for chicken coops under any condition whatever. Certainly by the use of some litter, peat moss or chaff, the wooden floor can be kept perfectly clean and dry; but in the majority of cases, however thickly it may be strewn, the hen scratches the litter all away into a corner, and the chickens have their feet on the hard floor. As a natural consequence, cramp presently ensues, and for that reason we do not recommend the use of wooden floors. If no dry soil can be found, a thick layer of granulated peat moss can be spread on the ground, as this substance is highly absorbent, consequently is not easily fouled; but whenever a piece of dry earth or good *short* grass can be found, let the coops be placed on that. It is a good plan to take the hen to the coop first, having previously dusted her thoroughly with pyrethrum powder, and let her have a good meal before taking out her brood, as after she is satisfied she will be more likely to attend to their requirements.

**Feeding Young Chickens.**—The chicks' first meal is the next consideration, and there is much difference of opinion as to what constitutes the best material for it. The old-fashioned method of hard-boiled egg mixed with breadcrumbs has a good deal to recommend it; the only objection to its use being that it causes constipation when continued long. We prefer to give egg custard made of cooking eggs, or even of unfertiles rejected from other hatches. The best way of making this is to warm some dripping in a pan over the fire, stir in the beaten eggs and some milk, and to continue stirring until the custard has set and begins to dry, afterwards mixing in some grated breadcrumbs. This is more digestible than the hard-boiled eggs, and is always greatly relished by the chicks. Chicken-meal, of which there are several well-known and reliable brands on the market, scalded with boiling water till it is crumbly, but *not* moist or sloppy, is a good food upon which to start chickens, but we have always preferred to give the egg and breadcrumb for the first two days at least.

It must be remembered that a highly nutritious diet is necessary for chickens, since they have to face the strain of rapid growth (involving the production of bone, muscle, and feathers), and a correct nutritive ratio (*q.v.*) for them should be as high as 1 in 3—*i.e.*, 1 part nitrogenous to 3 of carbonaceous food material. For the first fortnight chicks ought to be fed with great regularity every two hours during the daytime, and if possible, during the early months of the year, one or two meals should be given by candlelight. The chicks will soon get accustomed to feeding by artificial light, and will come out as they see the light coming. As early in the morning and as late as possible should be the rule in chicken-feeding; and where it is not possible to prepare a warm meal very early in the morning, a feed of dry chick grain should be thrown down, so that they can be working away until their breakfast arrives. For the first few days the meals should be given on a clean board, which is removed after they have finished; and when the chicks are older, feeding troughs of galvanized iron or of V-shaped pieces of wood nailed together and provided with legs, and having a guard rail across the top, should be supplied. The troughs must be kept scrupulously clean, nothing being more likely to cause bowel trouble than sour food left about. Sloppily-mixed soft food is another

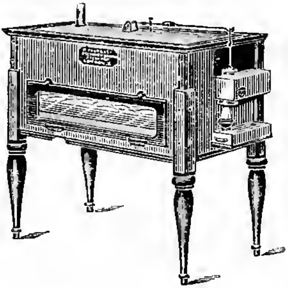

Fig. 13.—Hot-Air Incubator.
(Toope.)

common cause of the same complaint; food should be mixed dry enough to crumble in the fingers without sticking to them. The best results are as a rule obtained by giving alternate meals of dry and soft food, the first meal of the day being of soft and the last one of dry food, and by having as much variety as possible in the menu. Food of a very fatty or starchy nature is not suitable for chickens unless given occasionally. Many poultry-keepers prefer to feed on dry food from the very start, but when size in the stock is desired soft food should be given as well.

Oatmeal well mixed with milk is an excellent food for young chicks, and after three weeks there is not a finer food than ground oats. It should not be fed under that period on account of the husk it contains. Biscuit-meal is excellent, and middlings are very good for rearing when mixed with other foods, but should not be used alone.

**Dry Foods.**—There are many excellent dry foods on the market, but if a very large number of chickens are being reared it is cheaper to buy the necessary ingredients and do the mixing one's self. The following mixture is advised by the Board of Agriculture in their leaflet on feeding. For the first eight days:

| | |
|---|---|
| Canary-seed .. .. .. .. .. | 3 parts. |
| Millet-seed .. .. .. .. .. | 3 ,, |
| Finely-cracked green peas .. .. .. | 2 ,, |
| Hempseed .. .. .. .. .. | 1 part. |

And after that period the following:

| | |
|---|---|
| Rough oatmeal .. .. .. .. | 7 parts. |
| Finely cracked wheat .. .. .. | 8 ,, |
| ,, ,, maize .. .. .. | 4 ,, |
| ,, ,, green peas .. .. .. | 4 ,, |
| ,, ,, white rice .. .. .. | 1 ,, |
| Canary-seed .. .. .. .. .. | 2 ,, |
| Millet-seed .. .. .. .. .. | 2 ,, |
| Hempseed .. .. .. .. .. | 2 ,, |

Two soft food mixtures also advised by the Board of Agriculture consist of—

I.

| | |
|---|---|
| Scalded biscuit meal.. .. .. .. | 1 part. |
| ,, bran.. .. .. .. .. | 1 ,, |
| Pea or bean meal .. .. .. .. | 1 ,, |
| Barleymeal .. .. .. .. .. | 1 ,, |
| Buckwheat-meal .. .. .. .. | 1 ,, |

II.

| | |
|---|---|
| Scalded bran | 2 parts. |
| ,, sharps | 1 part. |
| Oatmeal | 1 ,, |

**Meat.**—One meal a day of cooked lean meat is often advised, but meat-giving can be overdone in the case of very young chickens. Animal food is, however, a necessity, but naturally-reared chicks can generally find sufficient if they are on a grass run. If they cannot, then a little meat may be given, and some ants' eggs supplied in addition. We do not advise green bone for birds under two months of age, and then it should be fed sparingly.

The intervals between meals must, of course, be gradually increased in length, till at two months four meals in the twenty-four hours are quite sufficient.

**Variety.**—Two little "variety meals" for chickens are as follows :

1. Take a small quantity of left-over boiled potatoes and smooth away any lumps; then, with the blade of a knife, add oatmeal till the two are thoroughly mixed. If properly mixed it results in a light crumbly mass which is much relished.

2. A cupful of chick rice should be soaked in a gill of skim milk, and cooked slowly in the oven till all is absorbed, when it should be mixed with breadcrust, which has been hardened in the oven and then rolled out. Groats soaked in milk and cooked till soft are also much enjoyed by chicks.

It is by giving these occasional changes of diet, and by tempting the appetite if the chicks seem to flag at all, that large healthy birds are made. In damp weather a little boiled linseed or a small quantity of hemp should be fed, and any tendency to diarrhœa should be checked by feeding rice for a day or two. We have found excellent results obtained by giving Phosto (a liquid preparation of phosphates) to young chickens, any tendency to soft bone or leg weakness being obviated by its regular use.

**The Feathering Period.**—A critical stage through which all chickens have to go is the feathering period, felt more acutely in the heavy than in the light breeds, in consequence of their carrying more feathers. Often a flock of chickens appears to lose ground during this period which it never regains afterwards, and extra attention at this time is well worth the trouble entailed. Foods supplied at this stage should be of a nitrogenous character, as this element enters so largely into the composition of feathers. Pea or bean meal, chopped sunflower-seeds, and boiled linseed, should all be included in the dietary. With regard to quantity of feeding, the golden rule is, *Little and often*, keeping the birds hungry and active, so that they search for their own living and are constantly on the hunt, and they must never be fed so liberally that they hang about the coop waiting for the next meal to be given. Keep the birds working, and their health will be satisfactory, as the amateur is far more likely to overfeed than to underfeed.

**Green Food.**—Green food is a highly important article of the chickens' dietary. Chopped grass or lettuce cut up very finely with a pair of scissors is much relished. A handful of grass, another of stale breadcrumbs, and another of coarse oatmeal all moistened with a little skim milk, makes a capital meal for a young brood. Mustard and cress can be grown in shallow boxes, also sprouted oats, giving only the tender young tops. Dandelion leaves are excellent for the birds, and we are firm believers in the virtue of boiled nettle leaves.

Chopped onions or garlic should never on any account be omitted from the bill of fare, since it has been shown over and over again that chickens who have had either of these *regularly* fed to them have been practically immune from disease, and that the dread disease of chickenhood, "gapes," is successfully kept at bay by their agency.

Where there is a very small run, it is an excellent plan to provide a little treat for the chicks as follows:

Three or four frames of light wood, 3 or 4 feet square and covered with wire netting (1-inch mesh), are laid over a piece of ground which has been sown with grass and clover seed. The chickens must be kept away from the vicinity till the grass has grown, and then allowed to pick at the green stuff through, but they cannot scratch it up nor foul it very much by reason of the netting over the top.

**Water.**—The question of water for chicks has been very much debated. Many experienced poultry-keepers seem to get excellent results by withholding it altogether while the chicks are quite young, though for brooder chickens it is without doubt absolutely necessary. Certainly, when a chicken is getting much soft food it is much less necessary than if grain alone is given, and it is better for chicks to be without water than to drink that which is not pure and fresh. Our own plan is to provide water twice daily while the chicks are very young, removing the water vessel in the interval. All drinking fountains must be of such a pattern that they can be easily cleansed, must be steady, so that they are not being constantly knocked over, and must never be allowed to stand in hot sun. It is certain that a large amount of the bowel trouble in young chickens is due to the drinking of unlimited supplies of fluid *in addition* to the large amount present in all soft foods as prepared for use. One can often see the chickens drinking dew from the grass when they are let out in the morning, and such small quantities as can be obtained in that way seem to do them no harm. Of course, if once the practice of giving water has been begun, it would be both painful and cruel to stop the supply suddenly. The very worst effects of all are those produced by allowing young chickens to drink very largely after a long period of abstinence from water.

**Grit.**—In all cases grit must be easily accessible to very young chicks, care being taken that it is sufficiently small and sharp. When they are a little older and the run is fairly ample, they can be trusted to find it out for themselves, but in any case it is wise to scatter a quantity round the coop.

It is not advisable to give the hen her liberty under a week or ten days, since she will as a rule wander too far and tire the chickens out, and chickens suffer most severely in such a case. Again, no protection is possible in case of heavy rain when a hen and her brood are wandering all over the place.

**Insect Pests.**—Whenever chickens appear to thrive badly while with the hen, the chances are ten to one that insect pests are at the bottom of the trouble. Both hen and chickens require a good deal of attention to keep these pests down. As mentioned before, every broody should receive a thorough dusting with pyrethrum powder before putting her in her coop, and it is wise to dust the chicks also. A further precaution consists in the application of the following ointment to the top of the head of every chick, renewing the application at the end of three weeks or a month; chicks treated in this way will be comparatively free from the dreaded "tick," which is principally found on the head, throat, and neck:

| | |
|---|---|
| Mercurial ointment | 1 ounce. |
| Lard | 1 ,, |
| Petroleum | 1 ,, |

Heated till semifluid, and one drop applied with the head of a match.

Caution must be observed in dealing with this ointment, since an excess of mercury would be dangerous.

## ARTIFICIAL REARING.

**Types of Brooders.**—There are two types of heated brooder very much used at the present day—the one heated by hot air, the other by hot water, corresponding to the two types of incubator. In the latter case the warmth is supplied by means of a tank filled with water, which is heated from an oil lamp, the hot water either passing through a coil or boiler, and then through circulating tubes to the tank. In one design of hot-water brooder the brooding chamber is fitted with tubes running around its walls.

In the hot-air brooders the heat from the lamp passes directly into the tank by means of a flue, situated in the outer chamber, so that the fumes from the lamp do not reach the chickens. The tank itself forms the inner roof of the brooding chamber.

Each type has its own advantages and disadvantages. Where the hot-water tanks are very large, it is difficult to regulate the large body of water in accordance with weather conditions. When the temperature is made sufficiently high for the night, there is the danger that the water keeps hot too long, and in the greater warmth of the day the brooder will be working at far too high a temperature unless sufficient ventilators can be provided to carry off the surplus heat. When the tank is small and the circulating pipe system is adopted, the danger is lessened, since the body of water is less, and can soon be cooled by simply lowering the flame of the lamp.

Some people prefer hot-air brooders, just as some prefer hot-air incubators, and certainly in this type the temperature can be raised and lowered very easily and rapidly to suit weather conditions. The hot-air type of machine which has no tank, but in which the lamp stands in the centre of the brooding chamber (the heat striking an inner metal roof which acts as a radiator), is not recommended, as it is scarcely possible that the fumes of the lamp can be successfully carried away from the chickens.

**Brooder Houses.**—When rearing chicks on a large scale in the early months of the year, brooder houses are used by large rearers to economize the labour which would be involved by using a great many small brooders. The general type of house is that supplied with heat by hot-water pipes running round the house, having wire guards to keep the chicks from getting too near the warmth. Hovers of board covered with narrow hanging strips of flannel allow the chicks to pass in and out as they like.

One well-known form consists of a gabled roof built over a trench in the ground, entered by steps at each end. The ground on either side forms a platform, level with the waist of the person who attends to the chicks, and each platform is covered with litter, and divided into runs of different sizes to suit chicks of different ages.

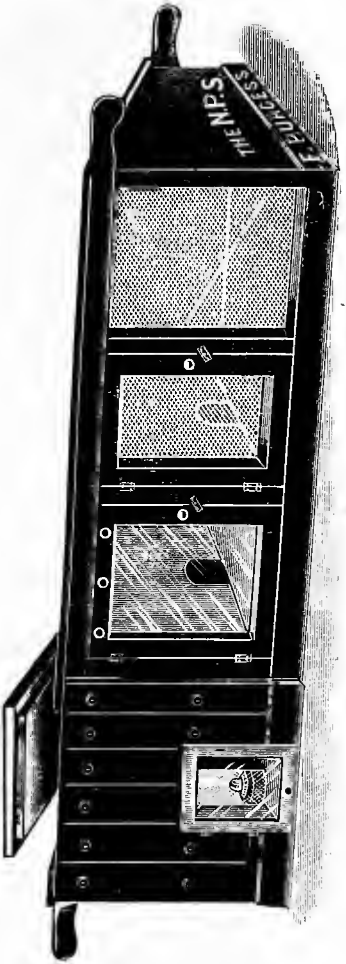

Fig. 14.—Fairmead Foster-Mother (Hot Air).
(New Poultry Syndicate.)

Windows in the roof are fitted with louvre ventilators, which can be kept open or closed at will.

The more simple the apparatus, the better, so that perfect cleanliness can be attained, and where the fittings are very elaborate this is a matter difficult of attainment. "Cold brooder" houses require an efficient ventilation system worked in combination with a sufficient of shelter and warmth, or the losses will be heavy.

**Good Points in Rearers.**—There are so many excellent rearers on the market that it would be invidious to particularize, but a few general hints on the purchase of rearers may not be out of place. The best type is that in which the heat goes right down to the floor of the warm chamber, giving the chickens the same warmth as they would obtain when nestling beneath a hen; having an equable temperature all over its surface, with no awkward corners into which chicks can crowd, the wood being well seasoned and the roof well constructed to carry off the rain; having the lamp situated outside the night nursery and of reliable construction, provided with a Stemp wick, and protected by an asbestos cover to obviate risks of fire; having ample ventilation, but with no draughts playing upon the chickens; a raised floor arranged well off the ground to avoid damp; all the parts well put together and of simple construction to facilitate perfect cleanliness and airing, and no unnecessary fittings and adjustments to get out of order.

**Management of Brooders.**—The general management of brooder-reared chickens differs in some respects very little from that of naturally-reared ones, but there are certain points where considerable difference of treatment is necessary.

The question "How many chicks should be reared in a brooder?" is often asked, and opinions differ widely. It is wise to remember that overcrowding must be strictly avoided, and that the birds increase in size very rapidly; consequently a foster-mother big enough for fifty day-old chicks will by no means suffice for their requirements at three weeks. It is always well, as in the case of incubators, to run rearers under the estimated number which they are supposed to contain. Pure air is an absolute essential for healthy stock, and it is a mistaken idea to imagine that the more chickens there are in the brooding chamber, the better they will be in cold weather. They may certainly be warmer, but they cannot possibly be so healthy, if they are overcrowded.

Coddling is very much out of place in chicken-rearing, and the question of temperature at which the warm chamber is to be kept is a most important one. Every precaution must be taken to avoid chills when the newly-hatched chicks are being brought from the hen or incubator to the brooder, as chill at that time is very serious.

**The Floor.**—Previous to its being used the brooder should have been working for a couple of days, so that it is perfectly warm and well aired before the chicks enter it. It is surprising how damp and cold appliances get when they have been stored away for any length of time. The floor should be well covered with granulated peat moss, wheat flights, or chaff, and littered down 2 inches deep if possible, so that a solid floor of the litter is obtained which is not easily scratched away or blown away, exposing the hard wooden floor underneath. Many people appear to imagine that a thin layer of litter is ample, whereas it rapidly becomes of no use, and the chickens get cramp in consequence of being on the bare boards.

**The Temperature.**—For the first week the temperature of the brooder should be 90°, *the temperature being taken after the chicks are in.* The natural warmth of the chicks' bodies will considerably raise the temperature; and if the brooding chamber had 90° of heat before they were put in, it is obvious that after they had been in occupation for any length of time the temperature would be utterly unsuitable for their well-being. The second week the temperature may be reduced to 85°, the third week to 80°, and left at that for a little while, afterwards being gradually reduced, until, as the chicks grew older, they are only having a little heat at night till the cold brooding time comes. Of course, all these temperatures are to be considered as liable to alteration, which should be made by the attendant in sympathy with the atmospheric conditions prevailing. They are, however, those most suitable for the early cold months of the year, the months in which heated brooders are most largely used. The light breeds, which feather more rapidly than the heavy breeds, may be cold-brooded, provided weather conditions are suitable, at six or eight weeks old. Heavy breeds may sometimes require from ten to twelve weeks if the weather is cold and they are feathering slowly. It is important to remember that overheating the brooding chamber does far more harm, and is productive of far more serious evils, than underheating. In the latter case the birds' growth and progress would merely be slightly checked, but overheating is the cause, not merely of bowel complaints, but of inflammation of the lungs, roup, and a general lack of stamina and vigour. An experienced rearer can tell at a glance, without using his thermometer, whether his rearers are working at too high or too low a temperature. In the former case the chicks will be separated to a marked extent, and will appear to be gasping for breath and obviously distressed; in the latter case they will be crowding and huddling together for warmth, making little plaintive "cheeps." Chickens can stand dry cold well as a rule, but wet and high winds sometimes tell severely upon them. They should have ample space, fresh air, and sunshine (the rearers being moved daily into fresh ground), and be placed facing south, in as sheltered a position as possible. The brooding chamber should be aired daily, and scrupulous cleanliness maintained therein. Lamps should have

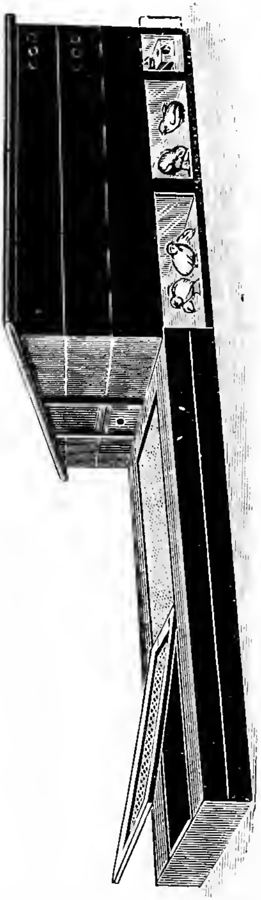

FIG. 15.—THE "SPHINX" REARER (DOUBLE NURSERY).
(New Poultry Syndicate.)

regular attention and the best oil only—White Rose or other refined petroleum oil for preference—must be used.

**Care of Lamps.**—In the majority of cases where a fire occurs it is due to careless attention, since the modern lamps are so well and carefully made. The Stemp patent wick needs very little attention, one or two trimmings lasting the whole time of a batch of chickens in the brooder. Other wicks need regular daily attention, and the morning is the best time to see to them. Wicks should not be cut with ordinary scissors, as these do not usually possess the necessary edge. All top charring should be first of all rubbed off with a piece of soft paper, and then the wick should be evenly trimmed with proper lamp scissors. It is a wise plan to allow two lamps for every rearer, since they can be used on alternate days and trimmed at leisure.

The night nursery ought to be cleaned out and well scraped down every day, and it is a good plan to sprinkle a thin layer of dry sand on the floor bottom before putting in the litter, the sand absorbing a good deal of moisture.

**Outer Runs.**—The most useful type brooder has two outer runs, one of which, roofed over and wire-netted, may be termed the " day nursery " ; whilst the other has no floor, but is simply netted in all round with ratproof netting, so that the chicks can get directly on to the grass in the daytime in good weather. It is best to have a wood floor on the covered run, so that the litter is not lost every time the run is shifted. Chaff, wheat flights, or oat culms, make good litter, and must be laid thickly down, as in the sleeping chamber. By scattering their dry grain in the covered run, the chickens are forced to take a good deal of exercise, and it forms a splendid playground for them when the weather is too wet or windy for them to be let into the grass run. For the first few days of the chickens' existence they may be fed in the heated chamber if the weather is very cold ; but it must not be continued long, and all food must be fed on boards and removed after a meal, as nothing is more likely to cause bowel trouble than soured food. Do not move the foster-mother on to sodden grass, but wait until the wet has dried off a little.

**Sickly Chicks.**—Every effort must be made after the first few days to get the chicks to feed and exercise in the open run, as the more fresh air and sunshine they get the better and stronger they will be. Any weakly or diseased chicks should be killed off at once, as they teach the others to "crowd," and in the more or less artificial conditions of brooder life one or two sickly birds are more a source of danger to their neighbour chicks than would be the case with hen-reared birds. It is a waste of time and food trying to rear sickly birds, as they generally get trampled on by the stronger birds, and succumb in the end, after much food and time has been wasted on them.

Brooder chicks are rarely troubled much with insect pests, but it is wise to disinfect and limewash the brooders between each occupancy.

**Feeding of Brooder Chicks.**—This differs in some respects from that of hen-reared chickens. In the somewhat different conditions of their life, it is found that brooder chicks need constant exercise and work if they are to grow sturdy; consequently the system of dry feeding entirely has become a recognized practice. It is found that soft food has a tendency to cause bowel trouble. By scattering the grains among the litter, together with the flint grit suitable for their age, the birds are constantly kept active. The economy of time and work is considerable in using dry food, and a poultry-keeper working on a fairly large scale and using many brooders finds this a not unimportant side of the question. Brooder chicks must have water, which must be supplied *regularly* in fresh condition, for if left for a long time without it (and being unable to procure it for themselves), they rush to it when it is brought, and drink to such an extent that death ensues.

Green food is almost more a necessity for brooder chicks than naturally-reared ones, and a perfectly regular supply must be given, bowel troubles being frequently caused by irregular feeding of green food. It is well to supply finely chopped grass for a week or so till they have acquired a taste for it, and will get it for themselves out of their run. Animal food must also be provided, and lean meat cooked well and chopped finely, ants' eggs, and granulated meat such as Crissel, can be supplied. During the first part of their career, while the temperature of the warm chamber is fairly high, it is a wise policy to feed sparingly, as it will prevent them from developing cramp—*alias* gout—which often attacks brooder chicks which are being fed too liberally and are not taking sufficient exercise.

**Cold Brooders.**—At the age of six to ten weeks, according to the state of the weather, the breed, and the condition of the bird's feathers, the birds should be cold-brooded. The warm brooder can still be used, if desired, by simply turning out the lamp and allowing the chickens to sleep, as before, in the night nursery. Large establishments as a rule, however, run separate cold brooders consisting of a covered run and sleeping apartment, the latter being lofty to provide air space, and well ventilated, but not draughty, the floor being well covered with granulated peat moss. The covered run should have an earth floor thickly strewn with litter, in which the birds can scratch on wet days. In fine weather they can simply run out on the grassland.

By the time the brooder chickens have got to this stage they can be treated, as regards feeding and general management, pretty much the same as chickens which have been brought up under a hen, and their meals may consist alternately of soft and dry food. If there are chickens of a similar age whose mother has left them, it is a good plan to let them all run together, provided the cold brooder is not overcrowded. It is never a wise plan to attempt to run chickens of different ages together; the younger ones nearly always come off badly, get knocked about, and have insufficient food.

When the chickens are old enough to leave the brooder, they should be drafted off into small chicken houses with no perches, as it is a great mistake to let chickens perch until their bones are set—*i.e.*, at about four months of age. If chickens are allowed to perch while young, the breastbone (particularly in the heavy varieties), being merely gristle, bends if it comes into contact with a hard perch, damaging the bird for either the breeding pen or the market. The first perches provided for chickens should be wide and flat. A dust-bath is a necessity for all chickens, and has only to be given to them for one to see how greatly it is appreciated.

**Separation of Sexes.**—This question is a very important one. The time at which this should be done varies a good deal with the breed, since the sexual instincts are not developed nearly as soon in the heavy breeds like Wyandottes or Orpingtons as in the light breeds—Anconas, Leghorns, Campines, etc. For the full growth and development of both the pullets and cockerels, it is highly important that they should be put widely apart as soon as this instinct begins to make itself felt. A flock of young cockerels brought up together gets along perfectly well, and an old cock may be taken from one of the breeding pens and put with them to keep order, instead of penning him up alone. The heavy breeds never grow so large if cockerels and pullets are allowed to run together, and in the case of the small active breeds the young cockerels are often a positive nuisance, needing separation sometimes before six weeks of age. It is easy to pick out the cockerels in a flock, say, of Leghorns, their headpieces being distinctive very early in the day, but it is not so easy to distinguish sex in some of the heavy breeds at a very early age. When any doubt arises it is safest to leave them together a little longer, and it may not be necessary to separate them till twelve weeks old.

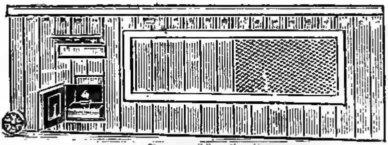

FIG. 16.—"SUNBEAM" HOT-AIR REARER.
(Tamlin.)

As a rule in the heavy breeds the heads are larger, and are carried more boldly in the case of the cockerels; and the shape of the tail of the male bird differs from that of the female even when quite young, but it is never possible for the inexperienced to be *quite* certain until the appearance of the saddle hackles.

Pullets which are allowed to run on with the cockerels will come on to lay far too early, and will not only lay very small eggs, but their own bodily growth and development will be seriously affected.

**Shade.**—Shade for growing chickens is an important point in summer management, hot sun being most harmful to young stock. Trees and shrubs are the best of all shelter, and an orchard (except in very wet seasons) is an ideal place for rearing. When the run is small, bush fruit can be planted, since little chickens do good to the trees by scratching, keeping the soil open round the roots, and by the manure deposited by them. Sunflowers should find a place in the rearing ground, since not only are they ornamental in appearance, but they are distinctly useful, providing a great deal of shade and a nice playground. They also afford a valuable by-product in the shape of their seeds; chickens greatly relish sunflower seeds split up, while they are a valuable addition to the menu of the moulting hens. If no shelter of a green nature is possible in the run, then makeshift shelters of hurdles covered by branches or fern leaves, or of coarse sacking or sailcloth stretched on sticks driven into the ground, must be provided.

**Change of Pens.**—The great point in rearing chickens is to keep them continually progressing, and that is not always an easy thing, especially when space is limited and the weather hot. Stock reared on free range or on a farm generally push along pretty well, growing large and muscular, and not putting on much superfluous flesh. It is otherwise with chickens reared on a small range, which often flag perceptibly in the middle of the summer, getting torpid and listless, not moving about very much, and in consesequence getting fleshy, which is not what is required in young stock birds, though all right for table chickens. The commonest cause of this is that their run is gradually getting tainted, not perhaps to a degree perceptible to us, but probably to the fowls, since they are breathing the air close to the ground. Removal to a fresh piece of ground is the best cure for this debility, and it is always well wherever possible to keep a reserve piece of land which can be used as a run just about this time. When the hay is carried, the clear fresh land forms an ideal "change of air" for the chickens; but any piece of run which has been vacant long enough to be sweet and clean is relished, and the birds seem to appreciate the newness and change of it just as much as human beings would do. Even if a new grass run cannot be supplied, a clean piece of earth which has been dug over, or a vacant portion of the vegetable garden, will suffice to give the chickens the *fresh start* they seem to require.

**Sorting the Chickens.**—Drafting out the chickens is an important step. All absolute wasters should be consigned to the boiling-pot; surplus cockerels sold; those which are intended for future breeding stock put far away from the pullets, having an old cock at their head to keep them in order; stock pullets kept growing, but not fed in such a way as to encourage premature laying; and all chickens intended for table use fed and reared separately from those which are to be kept for the breeding pens.

Batches of chickens of different ages rarely do very well together; the small ones get no fair chance in the matter of food, whilst, on the other hand, the number of meals the little ones get is too many for the older chicks. Neither must be slighted for the sake of the others; the little ones must have their proper number of meals, and the older ones must have the requisite amount of food suited to their greater size and appetite.

In the hot weather it often happens that the birds go off their food a little, and if they do it is a wise plan to omit one meal a day, and to give a lessened quantity for a few days at the other mealtimes, boiled nettles being an important item in the menu. It is a wise plan, where it is desired to retard pullets from laying too soon, to feed the stock pullets from the age of three months on an all-grain diet, using a variety of grains, but giving them separately, not all mixed together. Then, when the early autumn arrives and eggs are required, the soft food mixture of a kind suited to the production of eggs may be resumed.

**First Laying of Pullets.**—We do not advocate the encouragement of pullets laying until they are quite six months old. During the last two or three winters the poultry papers have contained many letters from poultry-keepers delighted with the prowess of pullets which have commenced to lay at four and five and a half months. We think results of the kind should be matters of regret rather than congratulation. Six months is quite early enough for egg production, even though it may be a matter of difficulty to prevent pullets from laying before. It is much better to sacrifice a few eggs for the sake of having a properly-developed bird which will lay a decent-sized egg. Of course, it must not be taken for granted that a pullet will lay of necessity at any particular age. Breed has a good deal to do with it, the heavy varieties naturally coming on later than the lighter breeds. Strain affects the matter, since early laying is to a certain extent hereditary, and by careful selection for two or three generations a flock of pullets which will come into full lay between six and seven months of age can be obtained, whereas in unselected stock it is often nine or ten months before the birds start work. Late February or early March hatched birds of the heavy breeds, and April and *early* May pullets of the light varieties, will start laying in the autumn before the frosts begin, and will probably go on through the winter. Feeding and housing alter dates of laying to some extent also, and where it is feared that a pullet will start laying too soon this can often be prevented by moving her about every week or ten days to fresh ground, giving hard corn, and only enough of that to keep her comfortably. Early-hatched pullets of the heavy breeds will sometimes come on to lay very early unless they are checked in time, and then go into moult in the autumn like old hens, not resuming work till after Christmas.

The stock pullets must be brought into condition for laying about September, giving plenty of sound nourishing food, a warm morning mash (including a little good poultry spice twice a week), and some cooked lean meat, and forcing them to take plenty of exercise by working for buried grain.

**Perches.**—Both pullets and cockerels after four months of age may be allowed to perch on broad low perches one or two feet from the ground; and towards the end of September the pullets which are to be the winter layers of the current year must be moved into their permanent winter-quarters, since nothing affects layers more than constant shifting about.

From this time onwards the "chicken" may be said to have merged its career in either the pullet or the cockerel, and the "rearer" may transfer his attention to the chapter on Stock Birds for information as to their adult requirements.

### DUCKLINGS.

There are, however, branches of profitable rearing to be considered other than that of the rearing of chickens, and we will next consider the best methods of managing young ducklings, turkeys, and goslings. It is somewhat surprising that more people who keep poultry should not attempt the raising of ducklings as well, since they are admittedly far easier to rear than chickens, and more free from disease; they require half the labour that chickens do, and for people who only have a small piece of ground, and have to consider neighbours, there is the additional advantage that a 2-foot wire netting will keep them within bounds. Elaborate housing arrangements are not necessary, and a pouring wet day or succession of days, which in some mysterious way often throws chickens back and picks out the weaklings, is only a source of joy to the ecstatic duckling. Excellent prices are paid for well-fattened ducks in the spring; the demand is large and increasing, and the turnover is quick, as the ducklings grow so rapidly. Ducklings must not be kept in the same run with fowls, as they would certainly make the chickens' drinking water in a mess, and the same methods of feeding are also not applicable. It is a mistaken idea to suppose that swimming water is an absolute necessity for the successful rearing of ducklings. Many thousands of ducklings for table purposes are reared in the great "ducking" districts of Buckinghamshire and Bedfordshire which never enter swimming water at all. Of course, swimming water is an essential for ducklings which are intended for stock, as only in this way will they develop large muscular frames and healthy constitutions. For about a month stock ducklings and table ducklings can be reared together, but after that time their ways must part. The management of young

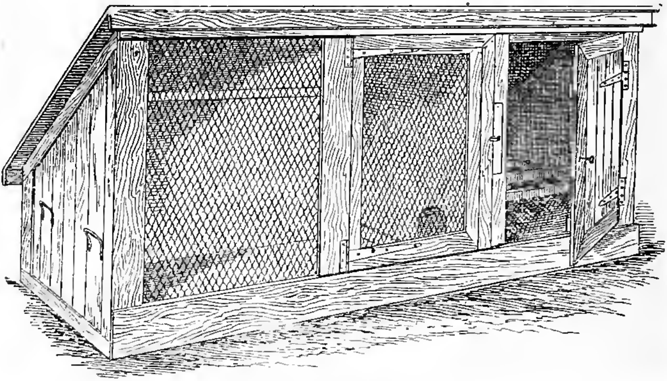

Fig. 17.—Chicken-House and Run.
(Hebditch.)

ducklings offers few difficulties, and few people who have reared a couple of broods will ever omit them again from the spring programme.

**First Treatment.**—Ducklings when newly hatched should remain under the hen or in the drying-box of the incubator for about twenty-four hours, to obviate any risk of chill. The essential of success in rearing depends upon getting the bird on as quickly as possible without any setback at all, and chill at this early stage of their existence is distinctly harmful. They are, however, extremely hardy, and do not require nearly such a prolonged brooding as chickens do, and at the end of a week the hen or rearer can be dispensed with and the ducklings allowed their liberty. They get on better and grow more quickly as a rule than when they are allowed to remain with the hen too long. When there are only a few, a large roomy coop will suffice for their requirements, the coop being substantially made, free from draughts, and resting upon the bare ground. A wooden floor never seems to answer in the case of ducklings, as they suffer from cramp and leg weakness when their feet are resting upon boards.

**Housing.**—When a good many are being reared, they can be housed in a large roomy shed, preferably one which is open-fronted, provided, however, with wooden or canvas shutters for protection on cold nights. Ducklings will not fly over a 2-foot boarding, and if the shed is divided by means of low fences, from twenty to thirty can be kept together in a flock. The ducklings intended for market are nearly always reared in this manner; they are allowed very little exercise, and are not permitted to swim at all, unless it be the day before killing, as this cleanses the feathers and is supposed to make them easier to pluck.

In warm weather the ducklings can be reared outside, on a plot of ground divided up into small pens. Of course, those ducklings which are intended for stock can be allowed their liberty, and can have as much exercise as they will, though for the first month it will be best to keep them in the sheds with the others at night, allowing them their liberty, however, during the daytime. The litter in the sheds, pens, or coops, must be changed very frequently, and either peat moss or straw will do for the purpose—preferably the latter, as it is cheaper.

**Breeds.**—The breeds most generally used for the early spring duckling trade are the Aylesbury and the Aylesbury-Pekin, ducklings eight weeks old of the first breed often weighing 4½ to 5½ pounds. The Buff Orpington duck is rapidly coming to the front for the duckling trade, as it is a quick grower and very hardy, and in addition the birds are good winter layers, consequently eggs can be obtained at the most valuable time. Rouen ducks are more frequently used for the autumn and winter trade, as they are of slower growth, but make fine big birds by the time they are required.

**Feeding.**—Of course, the feeding question is of great importance, especially during the first few weeks, as very much of the profit depends upon their treatment at this time.

For the first week they should be fed every three hours if possible, during the second week every three hours, and after this period to about five weeks old three meals a day are sufficient. At a month or five weeks those intended for market must be separated from the stock ducklings and fattened for the market. It is most profitable to sell ducklings at eight or nine weeks old, as after this date the pin feathers begin to grow.

**Variety of Diet.**—The principal thing to aim at is to have as much variety as possible in the feeding, and as many different foods should be used as are possible and inexpensive. For the first few days they can be fed on hard-boiled eggs chopped finely and mixed with breadcrumbs, and biscuit-meal moistened with skim milk. Ducklings like their food in a more sloppy condition than do chickens, and do not appear to suffer from this, but the other extreme must also be avoided.

After three days boiled rice may be given, and there is no more excellent (or inexpensive) food. It should not be cooked too quickly, but allowed to simmer on the fire till all the water is absorbed.

Egg feeding for a few days is wise, as it gives them a good start, but it is too expensive to continue long. Barley-meal mixed with sharps, and dried off to a crumbly condition, is a good standard food, but when given alone is apt to be too heating. An occasional feed of ground oats may be substituted, and one feed a day of oatmeal mixed with skim milk will bring ducklings along admirably.

Biscuit and meat meal, bread and milk, bran and peameal mixed up with cooked vegetables, Sussex ground oats mixed with beanmeal and middlings, are all variations in the matter of feeding. Ducklings appreciate green food, chopped onions, and the like, very much indeed, and from the very first must have liberal quantities. Sand must also be supplied to them. Water is always best given in a guarded trough, so that they cannot foul it.

Shade is essential for successful rearing, and it does not pay to rear ducklings in very hot weather. Until their first feathers are through they should not be allowed to be out in very heavy rain, or a good many will succumb.

Animal fat, intestines, and locust-meal, are recommended by many authorities as additions to the food when the market ducklings are being finally fattened.

### GOSLINGS.

Given suitable land and plenty of it, there is no class of poultry so easy to rear and so profitable to market as the gosling. It must be stated at the outset, however, that it is not the slightest use attempting to rear goslings if one has only a few acres of land. Geese need a tremendous amount of space, otherwise they grow slowly; and in addition they taint the soil very much, and for that reason it is not wise to keep them with other birds. Their appetites are enormous, and care has to be used in feeding, otherwise the profits vanish in the food bill. But at the same time there are hundreds of acres of land, waste land and scrub, where geese could be put to wander, and which at the present time are doing no good whatever. The improvement which a flock of geese make on poor land is very well known, and quite a poor piece of meadowland has been transformed into a really good bit of pasture by running a big flock of geese on it for a few years in succession. Of course, the better the land they are put on, the less food will have to be bought, as they will find so much for themselves.

**Housing.**—Goslings and ducklings are alike in that they need very little brooding, and after four or five days they may be removed from the hen and put in a roomy wooden coop without a floor, as the wooden floors cause cramp and leg weakness. In very early months the coops can stand under the shelter of a shed, but when the weather is good they are better in the open. For the first week or two the goslings are best penned in with movable hurdles, since they are apt to wander too far and get overdone if left to their own devices; but after this time, when they are well on their legs, the more freedom they have the better.

**Feeding.**—As regards the feeding, they may be given a start for the first few days on hard-boiled eggs, well chopped, mixed with biscuit-meal and skim milk. Onions and dandelion leaves are exceedingly valuable for goslings, and should invariably form a portion of their daily dietary.

The egg feeding is too expensive to continue long, and cooked food mixed with hot water, barleymeal, ground oats, and sharps, make good staple foods. At two months whole wheat, dari, peas, and beans, can be given, also clipped oats, but not whole oats or barley, as the husks are unsuitable for young stock.

Much of their food the goslings will find for themselves on the grass, and they, fortunately, increase the finer grasses at the expense of the coarser ones. This applies when small numbers are run on pasture, etc.; and since the geese eat off the seeds and ergot of the rye-grass, other stock thrives better. In large numbers they crop too closely, and would sour the land. In a very dry year goslings, of course, do not get on nearly as well owing to the poor grass, but where there is a good growth of grass they grow up into young giants, and as sturdy as possible. After the age of two months, two good meals daily should be allowed and a little meat given, the birds being ready for market when about three months old.

## TURKEY-REARING.

Many people are deterred from this branch of poultry work—in itself a very profitable one—by the exaggerated ideas which prevail as to the delicacy of young turkeys. It is perfectly true that they are not nearly as vigorous as young goslings or ducklings, and more difficult to rear than the average chicken, but there are three very common reasons for delicacy which can be removed by the exercise of common sense. In the first place, turkey chicks must never be bred from related parents, such birds rarely producing vigorous offspring. In the second place, many people use first-year turkeys as breeders, and this is a highly mistaken policy, since the turkey only reaches maturity at three years, and mating immature stock is much to be deprecated. The third reason is concerned with the land on which the chicks have to live. Damp, cold ground which is low-lying and heavy will never suit turkeys. They can stand *dry* cold much better than wet. Abundant room is also necessary for turkey-rearing, and the general farmer who has plenty of land at his disposal is the most advantageously situated for this purpose. Turkeys retain some of the characteristics of wild birds, and will not thrive on tainted land or that which has been much used by other fowls; and the bigger the range that can be supplied, the greater the chance of success. The American Bronze approaches more nearly to the wild-turkey than our English varieties, the Norfolk Black and the Cambridge Bronze, and, since it is less domesticated, does not do as well as they do unless it has plenty of fresh clean ground and a very wide range, although it is of a more hardy disposition naturally.

Turkey chicks must be allowed to remain on the nest till they are perfectly dry. At the end of thirty-six hours they may be cooped with the hen in a roomy coop, which preferably should stand under a cart-shed for shelter, since cold is highly detrimental at this early stage.

**General Management.**—It is better to coop them under a roof, and away from long wet grass, so that they can get exercise without any risk of chill or wet. The chicks need no food for twenty-four hours, but at the end of that time egg custard mixed up with biscuit-meal and milk may be given. At the end of three days, if the chicks are thriving, the egg may be discontinued, and the biscuit-meal allowed to form the staple food. Variety is as necessary to young turkeys as to any other form of young stock, and barley-meal mixed with ground oats or sharps forms a nice change. All soft food must be given in an almost dry condition. sloppy food having disastrous effects. Green food, preferably chopped onion and dandelion, must be supplied with every meal, and fresh water and grit are equally essential. Turkey chicks have very small crops, and cannot manage big meals at a time. They need feeding, in consequence, far more often than other young birds: every two hours for the first fortnight, and the interval between the meals lengthened gradually after that period. The chicks eat very slowly, and must never be hurried.

If the weather is warm and the coops are brought out in the open, they must be put on short grass, and a little run placed in front of the coop, giving both hen and chickens their liberty in the sunny part of the day. After three weeks they need only be cooped at night, and on cold nights pieces of sacking ought to be put over the coop tops.

At three weeks of age grain may be added to their menu, beginning with dari, cracked maize and cracked wheat, buckwheat, lentils, etc., and leading on to the larger grains. Steamed oatmeal is a valuable food, but if given raw has bad results. At three months old three meals a day are sufficient, and at four months two feeds. As soon as the stubbles are ready the turkeys can be put on to them, and from that time till the November fattening they will need very little other food.

**Shooting the Red.**—The dangerous period of a turkey's life occurs at about eight weeks—*i.e.*, the process known as "shooting the red." At this time they lose their appetites and look seedy and wretched, and everything must be done to tempt them to eat. They must be kept quite free from wet and away from long grass, quite free from draughts in their sleeping house, and given extra quantities of lean meat, together with the following tonic extensively used among turkey rearers :

| | |
|---|---|
| Powdered cassia bark .. .. .. | 3 ounces. |
| ,, ginger .. .. .. | 10 ,, |
| ,, gentian .. .. .. | 1 ounce. |
| ,, aniseed .. .. .. | 1 ,, |
| Iron carbonate .. .. .. .. | 5 ounces. |

The tonic should be mixed with the meal at the rate of one teaspoonful per average brood of ten turkey chicks. It should be given on wet days and as a preventive of diarrhœa.

After the growth of the red on the neck is complete, they will be pretty well fledged, and can be considered out of the danger zone. If carefully treated during this period, there is no reason at all why they should not be as hardy as other young birds.

## CHAPTER IV

## TABLE POULTRY

Effects of foreign competition—The best markets—Merits in the table fowl—Useful crosses—Seasonal prices—Rearing table chickens—Milk chickens—Fatted fowls—The Surrey system—Cramming—Marketing—Fattening of ducks, geese, and turkeys.

THIS highly important branch of the poultry-keeping industry is likely to become even more important each year, and the present time is one of golden opportunities for the far-seeing breeder. During the past ten years the consumption of table birds has increased enormously, and side by side with quantity there is growing a desire for quality in the matter of dressed poultry. The taste for table luxuries has spread among all classes, and our London markets show a variety of fowls suitable for all kinds of purchasers, from the large London hotel or West End club down to the poorest wage-earner who can afford to buy a "boiler."

The efforts of a society like the Utility Poultry Club have materially aided in raising the standard of our English produce. Since its formation the club has done much to encourage the production of table birds, especially among the farming community, and by its provision of prizes at shows for table poultry classes has done a good deal to arouse interest in the matter among the general public.

**Continental Competition.**—Foreign competition has done infinitely more good than harm to our English producers in the case of table fowls, despite the dreary fulminations of ill-advised persons against it.

Continental methods were for many years considerably ahead of ours, and the finest fowls exported from France and Belgium were undeniably "eye-openers" to many an English poultry dealer.

**Educating Public Taste.**—It is very largely to these magnificent specimens of fatted fowls and to the prices which they commanded in the best markets that we owe the education of the British palate, and the willingness to admit that it is infinitely better to pay 5s. and 6s. for a fine fatted English bird than 2s. 6d. for a lean and unfinished specimen.

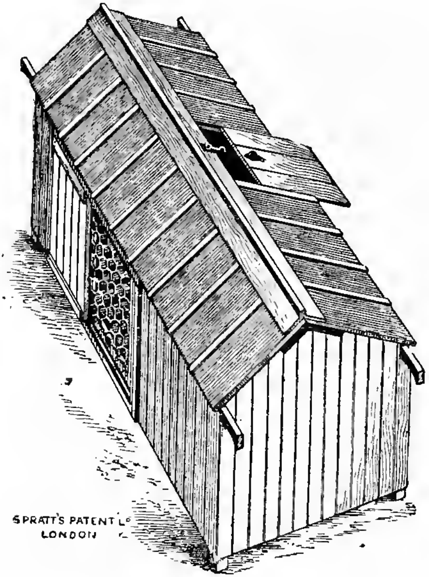

Fig. 18.—Movable House for Growing Birds.
(Spratt.)

Our English fatters and breeders have had for their pocket's sake to adopt better methods and to produce stuff which could vie with French and Belgian produce, and have met with great success, some of the birds turned out from the Sussex fattening sheds being second to those of no other country.

**Exhibition of Table Poultry.**—Exhibitions of table poultry have undoubtedly assisted also in this matter, though it may be doubted whether they have quite the practical value for which they are given credit. Many of the really splendid specimens of the fatter's art which one may see in a "dead poultry" class at a show have cost so much to bring to that pitch of perfection that for purely commercial business they would result in a loss rather than a profit. Still, as object-lessons they have a distinct value, especially in the matter of dressing for market. To mention one point only, the indefensible practice of smashing the breast-bone (still so prevalent in remote country districts) being absolutely "tabooed" in birds entered in a show has resulted in a yearly decrease in the number of birds sent to market in that condition.

**Extension of Breeding for Table needed.**—At the same time it is idle to deny that the same progress has not been made in the direction of table poultry as has been done in the case of eggs. There are very few districts of England and Wales in which raising table birds is absolutely out of the question, and very many in which the industry could be developed with an amazing degree of success. But at the present time many opportunities are being sadly wasted, and available material is not utilized as it should be. Methods of breeding, rearing, fattening, and marketing, time of production, and selection of the best breeds, leave much to be desired in many quarters even to-day.

**Imports.**—There is every likelihood of a largely increased demand every year. Many countries which formerly exported large quantities of dead fowls into England are now ceasing to send large supplies owing to increased consumption within their own boundaries, Germany and the United States being two noted cases in point. Ireland, again, whose shipments of poultry into England are of greater total value than those of any other country, is beginning to fatten table poultry for herself, and in consequence there will be a shortage of Irish chickens for the Sussex fatteners, who will have to turn to English breeders to fill their demands. Some 700 tons of Irish chickens enter this country every year for fattening purposes; and since this supply will be gradually absorbed by Ireland herself in the course of the next few years, there is a grand opportunity for rearers at home.

In 1911 our principal imports of poultry were from—

| | £ |
|---|---|
| Russia .. .. .. .. .. | 404,994 |
| France .. .. .. .. .. | 116,267 |
| Austria-Hungary .. .. .. | 92,597 |
| U.S.A. .. .. .. .. .. | 137,469 |
| Other countries .. .. .. .. | 166,870 |

Total of £918,197, less re-exports colonial and foreign, £840,024.

**Frozen Fowls.**—Some proportion of our imports consists of frozen birds of cheap quality, and we can hardly cavil at these, since a large number of our poorer population would never be able to pay the prices at which English breeders find it profitable to sell; and if we can secure the markets for the *better-class* fowl, we can afford to disregard items of inferior class.

In Russia, for instance, labour is notoriously cheap, and Russia can therefore afford to send frozen goods in at very low rates; but if the British producer were to attempt to sell at the same price, the cost of food and labour would reduce his profits to nothing. The same remark applies to the quantities of cheap foreign turkeys sent to our shores, but, on the other hand, we import large quantities of ducks and geese which, by reason of our good grazing grounds and abundant water-courses, we could very easily rear at home.

**Studying the Markets.**—The wise breeder of table fowls will take every opportunity which existing demands give him, and where possible will do his best to open up new markets. Certain demands are limited and seasonal, as in the case of the profitable *petit poussin*. In the spring, again, the stamp of chicken required is very different from the fat, heavy birds of the capon class which are in demand at Christmas.

The wise man will remember, too, that from January to April spring chickens that are plump and well-flavoured will fetch top prices, while the same birds put on a glutted market in June or July would be nothing but a drug. Provincial markets, again, have a very different range of prices (and of quality) from Leadenhall, and whereas well-fatted birds of prime quality will always be sure of top prices in London, it is quite on the cards that the sum obtainable in several of the northern districts of England would not be sufficient to cover the increased cost of production. Yellow legs and flesh, again, will bring a bird down to the second rank in London markets, unless these drawbacks are counterbalanced by exceptional size and weight, but in the provinces this is a matter of much less importance.

Some localities have a seasonable demand, notably seacoast towns and inland health resorts, and a profitable connection can be worked up by an enterprizing breeder of table poultry, provided that his birds are of the right stamp. Hotels and clubs are excellent customers as a rule, giving good prices for good stock, but being particular as to quality and regularity of supply. Indeed, one of the reasons why the small man is so handicapped in the matter of making contracts with these otherwise excellent customers is that he is not always able to fulfil them, by reason of shortage of birds. In that case it is infinitely better to buy birds in and fatten them than to miss the sale, as in the matter of obtaining good prices so much depends upon keeping the confidence of the purchaser.

**Dates of Hatching.**—In order to obtain the best results, the producer of table poultry is accustomed to hatch all the year round, thus meeting market requirements. Incubators are being increasingly used to fill up the gaps where broodies are not forthcoming, though it is interesting to note that many of the Sussex fatteners prefer to deal with chickens that have been hen-hatched rather than with incubator-hatched birds ; and in the Aylesbury district the majority of the " duckers " still stick to the broody hen, albeit the trouble involved is so much greater. For the winter trade a longer rearing period is necessary to make good-sized specimens, and June and October hatched fowls will do the best. For the spring-chicken trade hatching operations should commence in December, and continue till about the end of March. Later than that the birds will hardly be profitable until the end of June, when operations may commence again. Ducklings, to make the best prices, should be on the market early, and January is the best month in which to hatch for the March and April markets, goslings following on in February and March.

**Standard of Merits in the Table Fowl.**—A good many points have to be taken into consideration when weighing up the merits of a table fowl, and perhaps there are few subjects on which poultrymen of experience differ so much as on the question of the breeds or crosses likely to produce the same. In the ideal fowl, of course, there would be so many merits that it would be scarcely possible to find them combined in a single bird. The perfect table fowl would have a large carcass, long and deep, with fine bone and very small amount of offal, good flesh with a pleasant flavour, no unnecessary fat, plenty of breast meat, with white legs, flesh, and skin.

Some purchasers, of course, judge a fowl mainly by its size; others, by the amount of breast meat or by fineness of bone; and from the point of view of the producer there are the equally important merits of speedy maturity, cheapness of production, and capacity for fattening.

The following standard for table poultry has been drawn up by the Utility Poultry Club:

| | | | |
|---|---|---|---|
| 1. | Size and quality | 25 | points. |
| 2. | Youth, quantity and quality of breast meat | 30 | ,, |
| 3. | Straightness of keel, fineness of bone, absence of offal and surplus fat | 25 | ,, |
| 4. | General marketable appearance, colour of skin, etc. | 20 | ,, |

With regard to this matter, it may be again stated that the cost of attaining a high standard has to be considered by practical breeders, and, while endeavouring to reach as high a measure of success as possible, the question of market value is bound to enter in. In connection with this, it is interesting to hear that several Sussex fatteners, while admitting the admirable qualities of a Game-Dorking cross for the *finest specimens,* state that for ordinary commercial purposes the Sussex or Faverolles fowl meets their purposes better, as the birds develop more quickly, and in consequence leave a wider margin for profit.

**General Build of the Table Fowl.**—The breeder of table fowls must not only have birds of a suitable breed, but they must also come from a strain which has not lost its table characteristics in favour of heavy egg-producing ones. In many cases crosses give the best results, as what is lacking in the one breed can be made up with the other. Table birds should be square and cobby in shape, with good flat backs and short legs. They should be large-bodied and deep-breasted, especially in front, so that good slices can be cut. A deep keel will give this quality, and such a bird appears very broad at the shoulders. Narrow-breasted fowls will not supply many slices of meat.

**Value of Crossing.**—The reason why crossing is valuable is that the largest pure breeds are generally a little deficient in quality, while the best quality table fowls are frequently delicate and slow growers. Where it is desired to improve the general table qualities of a flock, a male from one of the recognized table breeds should be selected, and yellow blood is best transmitted through him, as the majority of the chickens bred by him will have pale-coloured legs and flesh.

**Best Breeds and First Crosses.**—Among the best pure breeds for the table we may reckon the Dorking, that prime Old English favourite, with its splendid breast development; the Sussex, the typical farmer's "fowl" in all its varieties; the Faverolles, hardy and of excellent build, although a little coarse in texture; the Buff, White, and Jubilee Orpingtons; and the Old English Game.

As regards good first crosses, the choice is almost unlimited.

Nearly any Dorking cross is good, Old English Game or Indian Game cockerels with Dorking hens making magnificent table birds, albeit not as quick growers as some crosses. Again, the Game cross can be used with advantage on Buff Orpington fowls or the Buff or Barred Rock. In the case of a Rock cross, the Old English Game would be preferable, as the progeny would have white legs for the most part. Brahma-Dorking or Sussex-Dorking will also produce very large specimens.

Houdan - Buff Orpington is becoming a very popular cross; so also Houdan-Faverolles and Faverolles-Orpington.

Plymouth Rocks are hardy and quick growers, the yellow legs being the only drawback, but in crossing this can be obviated. Many of the Irish chickens sent across for fattening are of Rock crossing with Dorking or Light Brahma.

Many breeds flesh very quickly, while it has been aptly said that one might as well try to fatten a greyhound as some of the Mediterranean breeds. If yellow-legged breeds or crosses are used, care should be taken that the birds are of a large size—*i.e.*, Wyandottes, Indian Game, or Rocks. Rhode Island Reds seem to sell well, though they have yellow legs; but the skin is as a rule fairly white, and the birds attain a very good size.

**Values.**—Surrey and Sussex fatters will give good prices for birds all the year round if sent up at the age of sixteen weeks in lean condition. During January, February, and March, as a rule well-fattened chickens are scarce, and will average 3s. 6d. apiece. In April and May the price rises to 4s. 6d., sometimes 5s. In June this is lowered slightly, 3s. 9d. to 3s. 6d. being the general rule. After that prices drop to 2s. 9d. and 2s. 6d. for the most part, beginning to rise again in November, and reaching 4s. in December. Of course, all these prices vary very greatly in accordance with the general state of the market and the locality. We have seen prices quoted in the same week for London and provincial markets with as much as 2s. difference between them. London is the best market, especially for "luxuries" and out-of-season dainties, and some of the small country markets have deplorable prices (from the point of view of the producer, that is). In any case we cannot command the prices here in England, even for our best fatted stuff, that can be obtained in France or Belgium. In some English districts 2s. 6d. was regarded not so very long ago as the top price to be paid for a *fatted fowl*, but prices are steadily advancing.

Small ducks make low prices, and are hardly worth the sending, as they have to compete with the cheap foreign birds. Good large birds, whether ducks or ducklings, make good money, however. Ducklings will fetch 7s. or 8s. each before the regular season begins, but as a rule the difficulty of getting eggs from Aylesbury ducks for sitting has prevented an early supply of ducklings in any quantity. When one considers that birds hardly bigger than a pigeon will fetch that price, it seems worth any trouble to secure it; and the Buff Orpington duck, which is coming to the front so rapidly both as an egg producer and table bird, is overcoming that difficulty, as its eggs are produced at the right time if properly managed.

Capons and large heavy birds of that class will fetch 1s. to 1s. 3d. per pound at Christmas. Turkeys pay better per pound if heavy birds, and an average lot weighing 20 pounds each would fetch 2d. or 3d. a pound more than a number weighing 16 or 18 pounds each.

**Size of Birds.**—Chickens are required to-day to be of good breed, but not of abnormal size. The Christmas market is the only one demanding heavy birds (those of the capon class), but for the greater part of the year the most profitable birds are those of moderate size, having fine bone, well covered (particularly on the breast) with fine meat of a delicate flavour, and having white legs and flesh. Chickens for the May markets should be young, quick-grown birds, fed well, put on the cramming system at eleven weeks, and finished for market at fourteen weeks. Of course, the later birds, as they are required to be heavier in weight, are older, and the best birds found in the London markets in late June and in July are from sixteen to eighteen weeks old, and proportionately heavy.

**General Advice in Rearing Table Chickens.**—The choice of district when the breeding and rearing of table fowls is being taken up as a definite means of livelihood plays an important part in the success or non-success of the venture. Nearness to a good market, railway facilities, and the presence or absence of higglers in the district, are all important factors. A warm, light soil is desirable, chickens developing several weeks sooner than when they are grown on cold, heavy land. This is highly important, as one of the chief considerations in rearing for market is to insure a quick and uniform growth with the minimum of expense. The profit depends on the maximum of development being attained within a limited time, and any setback means a certain if small diminution of that profit. Growth of table chickens may be maintained to some extent on unnatural lines by means of forcing diets, but fresh air, sunlight, and exercise, are essentials. In winter the southern slope of a well-sheltered hill forms a good rearing ground, whilst in the summer orchard or woodland provides an ideal place unless the season is exceptionally wet.

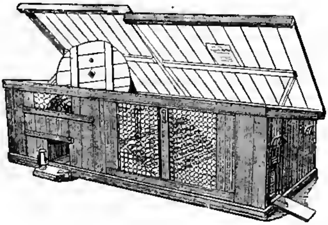

FIG. 19.—THE "LORNA DOONE" FOSTER-MOTHER. (Hebditch.)

Good table breeds or crosses must be selected, and hatching carried on at regular intervals, so that a supply may always be available either for home fatting or for disposal to fatting establishments. Chickens do best when kept in lots of similar age, so the capacity of the pens must be gauged, and the different batches sent off as soon as ready. From February to May, when the supply rarely meets the demand, the fatters will give as much as 3s. or 4s. a chicken in unfinished state; and as the cost of growing chickens to twelve weeks ought not to exceed 1s. 3d. or 1s. 6d., including the original cost of the egg from which the bird was hatched, it will be seen that rearing for the fatter is itself a profitable side line in poultry-keeping.

**Petit Poussins.**—Efforts should be made to popularize the taste for these delicate little morsels. If a brisk demand could be created, this would be found a very paying branch of work. At present the market lies among large London hotels and private houses, clubs and restaurants, and in the larger cities of the provinces. The birds are killed at six to eight weeks old, and should weigh from 10 ounces to 1 pound. Such well-fleshed and nice-flavoured birds, with little bones and a dainty appearance, will fetch from 1s. 3d. to 2s. each, the demand being practically identical with the London season.

The taste for these birds originated on the Continent, as the name denotes, and even to-day 80 per cent. of the best specimens one may see are of Continental origin. Fluctuations in the French markets of course have a bearing on the number of birds sent over here, and therefore on the prices.

Only quick-maturing breeds are suitable for this trade, and it is interesting to note that, while the French use the Houdan and Faverolles—notably the latter—the Belgians prefer the Braekel or Campine. As a matter of fact, the non-sitters — Leghorns, Campines, etc. — make excellent *petit poussins*, since they mature very rapidly, and when killed at that early age the flesh is still tender and soft, and devoid of the stringiness one associates with the majority of the non-sitting breeds.

The Dorking forms a splendid "milk chicken," but is rather delicate, and for ordinary purposes the Faverolles, La Bresse, Houdan-Orpington, or Houdan-Faverolles, will answer the purpose admirably. Chickens of that age have in any case not much flavour in their flesh, but the essential thing is to turn out plump and well-fleshed little birds, like plump partridges. From the shell, flesh-inducing foods must be used, mainly of a soft nature, for the grain feeding which succeeds quite admirably in the case of stock birds does not answer in the case of milk chickens, soft food making the flesh whiter and softer.

The first feeds may be of egg and breadcrumbs, or egg and biscuit-meal moistened with skim milk, continuing this for a week or so, after which a good cooked food may be substituted. Variety in feeding is essential in order that the chickens may not sicken, and that they may be tempted to eat as large meals as possible. For the first fortnight every two hours during the day is not too often to feed them, with one or two meals by candlelight in addition if possible.

Oatmeal, middlings, boiled rice, barleymeal, biscuit-meal, and ground oats, are all useful to ring the changes on, together with chopped green food and steamed clover hay. Milk should be supplied for drinking as well as for mixing in with the soft food; but whilst whole milk appears to give the finest results, the chicks frequently sicken, and for general purposes skim milk is preferable. The more quickly the little birds can be developed, the greater is their profit, and any check in growth must be guarded against. Their life is so short that methods of feeding and rearing can be used which would be otherwise unsuitable. If the cockerels of ordinary stock chickens can be detected at six weeks, it is an excellent plan to turn them into milk chickens by a fortnight's feeding on milk and meal, when they will be found plump and tasty, though hardly as "ripe" as when reared from the shell as such.

When the time arrives for killing, the birds should be starved for eighteen hours before killing, and plucked while warm. The skin of such young birds is extremely tender, and great care must be exercised in plucking. The beak, eyes, and legs, should be carefully wiped, and no packing attempted until the birds are perfectly cold. A clean basket should be lined with white paper, and the chickens packed tightly together, with paper between each and over the top; the number of birds should be written on each hamper, and they should be sent off as soon as possible. As the market for these delicacies is limited, and the trouble of preparing the birds not small, it is well to make preparatory arrangements before despatching the birds. A nice uniform lot will command the best prices.

**Poulets de Grain.**—This is a Belgian term for a fowl of similar character, fed in the same manner, but killed at a greater age—from two months onwards. The Malines fowl, which is the principal Belgian table breed, is mainly used for this purpose.

**Broilers.**—Americans are particularly fond of these, which are simply small chickens killed at six to ten weeks old, according to their growth, and weighing from ¾ pound to 2 pounds. The name is derived from the method of cooking, the birds being split in two down the middle, and then broiled on a gridiron. They are reared in brooder houses or small chicken runs, but are not crammed in any way, soft food being fed, and milk provided for drinking. Americans use for the most part the White Leghorn and Plymouth Rock, which are rapid growers, and at an early age quite tender and juicy. At the present time there is not a large demand in England, but an enterprising poultryman might make a good thing out of it by popularizing the dish as a novelty.

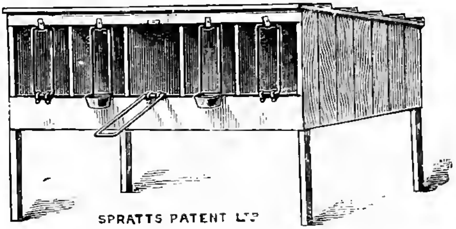

FIG. 20.—FATTENING CAGES.

**Spring Chickens and Fatted Fowls.**—These form the bulk of the best English trade, and it is in this direction that markets are opening out so widely. Within the limits of the Sussex fattening industry alone, an area of some 75,000 acres, we are told that the yearly circulation of money amounts to a quarter of a million pounds, the chickens being turned out at the rate of one and a half millions per annum.

The Sussex industry is one which has been built up by degrees, and has expanded with its markets. Fattening, or "ripening"—the better term—has been brought to a fine art, the expert knowledge being handed down from one generation to another. The fowls sold in the markets as "Sussex" and "Surrey" fowls are not necessarily bred or reared in either of those counties; the name implies the system of fattening, which has become sufficiently scientific and profitable to stamp itself upon all birds submitted to it.

**Fattening, or Ripening.**—Fattening may imply either the whole system of feeding from hatching to killing, or may merely mean the concluding portion of the process of production for market. The complete process is highly essential from an economic point of view, for not only may there be high feeding from the shell, but there must be the finishing of the final weeks of preparation. The effect of a few weeks' high feeding upon a thin, badly-fed chicken is to deposit flesh and fat in some parts of the body, but not to produce an even covering of meat, well deposited around the body, which constitutes the perfect table chicken. Again, a chicken may be well fed from hatching to killing, but if it has not been submitted to the final ripening it is bound to lack something which the first-class fatted fowl possesses, both in the matter of weight and in the tenderness and fineness of the flesh.

**Loss by Killing in Lean Condition.**—The annual loss by premature killing of lean poor fowls is almost incredible when one adds private executions to market figures. This is partly due to the exaggerated ideas many people have of the difficulties in fattening, and partly because of the disbelief in the practical benefits. Economically this is a great mistake. Other classes of stock are invariably fed up before being consigned to the killing house, and the difference in price more than repays for the trouble and cost of feeding. Lean animals have a small proportion of flesh of an inferior quality to the amount of bone and offal they carry, in comparison with that of a fed beast. It is estimated that under normal conditions a bird will put on from 1½ pounds to 2 pounds in flesh in the fattening pens, and the cost of fattening for three weeks should not exceed 5d., so that the increased weight more than justifies the operation. In large establishments, where labour has to be reckoned, the expenses connected with fattening would be more than 5d., but the output is so much greater that it would work out to about the same.

**Age for Fattening.**—The bulk of the spring chickens are put up for fattening from three months of age upwards (though the spring chicken for the London season makes its way on the market between the ages of twelve and fourteen weeks), and the best fowls are turned out from quarters where the *rearing* of the fowls has been carefully carried out.

**Feeding.**—Feeding from the shell should be nourishing (yet inexpensive), and of a nature calculated to make speedy growth. Soft food is much preferred to grain, as the continual use of soft mashes develops a larger crop for future cramming, as well as conducing to soft flesh and quick growth.

**Breeds.**—These vary very much, even among the recognized "table breeds," as regards suitability to the fattening process. The birds must not only be strong and of sound constitution, but of a quiet and tractable disposition; otherwise they will simply fret their flesh off instead of putting it on in the fattening coop. For instance, Game fowls, both Indian and Old English, while making flesh splendidly on the run, frequently become restless and thin when put up to fatten. Sussex fowls, on the other hand, or Dorkings or a Brahma cross, will settle down readily, and proceed to make flesh without any trouble. It is interesting to note that three of the most popular breeds, the Sussex in England, the Malines in Belgium, and the Faverolles in France, have been evolved by producers from composite breeds for their own practical needs, and in all there is hardness and general fitness combined with perfect suitability for the fattening process.

**Half-Fatted Fowls.**—There is a good demand for these, in many districts a greater demand than for fully-fatted birds, and at present this seems a market of great promise. Half-fatting is both cheaper and easier than the full process, though the birds can hardly be said to equal the ripened specimens.

The process simply means that the birds are put up for feeding in cages, for the most part out of doors, without any cramming at all. The birds are shut up in the pens or cages (to be described presently), and fed from troughs hung in front of the cage twice daily. At the end of ten days' feeding they are killed, and that is the most profitable date of killing. To continue the process longer would be to exceed half-fatting, and though the value of a half-fatted bird is more than that of one taken off the run and killed, the margin of profit is not so great as to allow any increase in the cost of production. Certainly in many parts of the country, where the consumer has not been educated up to the prices required for ripened birds, it forms an excellent method of leading them on to the more expensive birds.

**Sussex Fattening Methods.**—We will now consider the finished article, the ripened or fully-fatted fowl, and the methods adopted by the most successful exponents. During the whole process the birds are kept in fattening cages, being fed for about ten days from troughs, with another ten days' cramming. These periods vary considerably, as each bird differs as to its stage of "readiness," and the fatters can gauge to a nicety the condition of individual fowls.

**The Pens.**—Most of the fattening coops are about 7 feet long, and divided into three compartments, with a sliding door in each. As a rule eighteen birds are put in a cage, six in each division. The cages are made of wooden slats wide enough apart to allow the birds to get their heads through, but no more. The bottom is slatted also, the slats being specially cut to allow the birds to stand comfortably on them, the droppings falling through.

The tops are usually made of matchboarding, but thatch is often laid along the top if the pens are outside. Each cage is about 3 feet from the ground, the droppings falling into loose earth or sand, which is removed daily. The accumulation of manure under such conditions would speedily cause disease, and therefore scrupulous cleanliness is observed. Between each occupancy the cages are washed out with limewash, and the shed in which, in the majority of cases, the cages are placed, is also treated.

In mild weather out-of-door fattening is frequent, and if the cages can be placed in a shady orchard the conditions are very favourable, provided proper protection against rain can be given. The main idea is to keep the birds warm, quiet, and in semi-darkness, and for the last reason it would seem that indoor fattening was the more suitable. A roomy, well-ventilated shed answers the purpose very well, and if curtains can be dropped across the front of each cage between mealtimes, the birds will get more benefit from their food. In cold or damp weather indoor fattening is of course essential, that the food may not be used up for the maintenance of heat, but may be all turned into flesh.

It is better to have several birds in the one compartment, for if one bird is placed by itself it will usually pine, whereas a number will eat in competition with each other.

Six, on the other hand, seems rather a large number, and it is possible that three fowls in a cage would give the best results, but there would be the expense of so many additional cages that a large fatter would rarely attempt it.

**Feeding.**—For the first ten days or so the food is placed in V-shaped wooden troughs, which are hung on to the front of the cages, and removed between meals, being frequently scoured and scalded. The hours of meals are not important, provided they are given with the utmost regularity. Seven o'clock in the morning and seven at night are suitable hours. Before putting birds in the pens, it is highly important that they should be starved for twenty-four hours, as they will then have a hearty appetite when penned, will eat a good meal, and settle down comfortably. Amateur fatters should feel the crop of each bird immediately after a trough meal, and if it feels soft and flabby the appetite may be failing, and the bird should be closely watched. If any birds appear to go off colour while being trough-fed, a day or two in the open run on hard grain, and only one feed of that, will usually put them right. Sickly fowls, however, or persistent "bad doers," should be put out of the fattening pen, as they will never make good specimens.

**Foodstuffs.**—Where first-class results are desired, pure Sussex ground oats, mixed with soured skim milk and shredded mutton fat, gives the best results.

Birds which are not required for the best trade will fatten very well on a mixture of sharps, barleymeal, and Sussex oats. Maizemeal, though cheap, is not advisable, as it tends to form yellow fat of a greasy nature. Boiled potatoes, well cooked and mashed finely, may also be added to the "second quality" mixture. Buckwheat-meal is largely used in both France and Belgium, and, though rather heating, undoubtedly tempts the appetite of the birds.

Sussex ground oats may be obtained in other parts of the country—or what passes for the same thing ; but undoubtedly the Kent and Sussex miller produces the finest. Whether this is due to the particular grinding of the stones or to the quality of the oats used (American and Russian for the most part, as they are small and plump and dry, and consequently do not clog the stones) is an open question, but the Northern fattener will be well advised to pay a little more for his feeding stuffs so that he gets the genuine article. The milk which is used to mix the ground oats to the consistency of thick porridge is preferably skim, whole milk being too sweet and putting the birds off their meals. The large fatters nearly always use the milk in a sour state, the theory being that the acid generated helps to maintain health and stimulates the appetite.

Boiled nettles should be given twice a week in the troughs together with the other food. This is of great value in keeping the fowls in a good state of health.

During the first few days of feeding very little fat is used, the quantity being gradually increased until the maximum quantity is reached, this being about ½ ounce per diem for each bird. The best results are obtained from mutton "cauls," or Australian tallow, but the fat must be well boiled, and mixed in very thoroughly with the food to avoid lumps. Most professional fatters can gauge to a degree the amount of food required by each bird, and the exact point at which the bird begins or ceases to profit by the treatment. In the big fattening establishments the food is as a rule mixed immediately after each meal in readiness for the next, and it is allowed to stand in the interval.

**Cramming.**—This is the last stage in the fattening process. There are three methods of cramming in general use. The first is by hand, and, while the labour involved is far too excessive under most circumstances, it cannot be denied that fowls fatted in this way have a greater "finish" than those treated in any other way.

**Hand Cramming.**—The operator takes a pellet of food from a number rolled up in readiness, dips it into milk, and, holding the fowl between the knees, inserts the pellet into the mouth, then gently presses round the gullet till the food is passed into the crop. Each fowl receives about fifteen of these pellets, and a skilled operator can do the work with surprising quickness. After the pellets are all swallowed, the bird is returned to the cage.

**Funnel Feeding.**—Funnel feeding is not common in England, the French employing it to some extent. The funnel, which has a piece of rubber tubing fixed to the lower end, is placed in the gullet of the fowl, and the food is then poured down into the gullet through the mouth of the funnel. For this process the food has to be mixed thinly and with perfect smoothness. This is much quicker than hand feeding, as in the former case the quickest worker could not get through more than forty or fifty birds an hour whereas in the latter seventy or eighty could be dealt with quite easily.

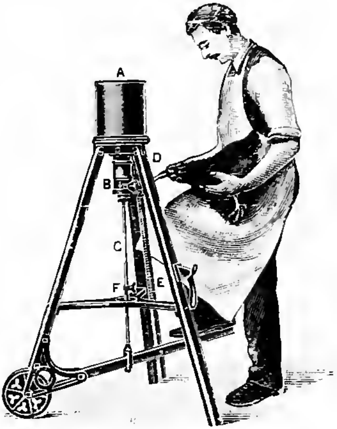

FIG. 21.—CRAMMING MACHINE.
(Tamlin.)

**Machine Cramming.**—This is much the most common method in England. The machine is worked on a pump principle, the food being poured into a hopper, through which it passes to a lower division, from the base of which a "plunger," worked by a pedal, forces up the food, by means of a rubber tubing, into the gullet of the bird. The foot works the pedal, so that both hands are free to attend to the bird, which is securely held under the arm. The slightest pressure of the foot forces a quantity of food into the crop. The operator, holding the fowl, extends the neck of the bird, and, holding its tongue down, inserts the rubber nozzle down the gullet. The operation is quite simple, but needs care. With the disengaged hand the crop is felt, and when it is sufficiently full of food (which is mixed to the consistency of thick cream in order that it may flow down easily) the pedal is released with a sharp jerk before taking the nozzle out of the gullet. This precaution is very necessary, as otherwise a good deal of food may be pumped into the windpipe, causing suffocation. Care must also be taken not to fill the crop too full, or it may burst. A skilful operator can cram between two and three hundred birds an hour by this system.

**Fasting.**—When the bird is sufficiently " ripe," it should be fasted for fully twenty-four hours before being killed, in order that the crop and intestines may be quite empty of food. This precaution is specially needful in hot weather, as the birds will soon begin to smell disagreeably if decomposing food is left in the body.

**Killing.**—Cutting the throat and "palating"—*i.e.*, sticking a knife through the roof of the mouth and the brain of the fowl—are equally messy and disagreeable methods, and dislocation of the neck is the most humane and the most cleanly way.

When properly done, there is no blood on the head, as it all drains down into the cavity formed when the neck is broken, and the body flesh is perfectly white if the bird is kept in the same position—*i.e.*, head downwards—as when it was killed. Practical demonstrations are better than theory in a case of this kind, but a brief description may be of use. The bird should be held by the legs in the left hand, keeping the wings still with two fingers. The head is then taken between the first and second fingers of the other hand, the comb touching the palm of the hand. The neck is then drawn out quite straight to its full length, and then upwards with a sharp pull. There can only be a second of pain, as the vertebral column is instantly severed from the brain.

**Plucking.**—This should be done while the bird is yet warm, as the feathers come out much more readily. The best position to adopt is to sit on a low chair, holding the bird by the legs, with its head dangling downwards. The feathers are pulled out the reverse way from which they grow on the body, and a sharp pull is less likely to tear the skin than a more cautious one. Only practice makes a quick as well as a good worker, but thoroughness must come before speed. The back should be plucked first, then the breast and under-part, the neck being plucked to within an inch or two of the head. The legs need careful attention, so also do the wings, while if the tail is carelessly done the flesh may easily be torn, and nothing is more unsightly than torn flesh.

**Stubbing.**—This is not always necessary with young chickens, but with older fowls it is very necessary to take out the short thick quills which have not formed into feathers. An old knife, not too sharp, put under the stub and gripped with the thumb, will usually extract them if a sharp backward pull is given.

**Singeing.**—The practice of dipping fowls into boiling water to get rid of the fine hairs is to be condemned, as it spoils the look of the flesh for market purposes. As, however, the hairs look very unsightly, it is well to light a wisp of straw (paper will do, but it is apt to char and blacken) and pass the bird over it, holding the body by the legs, and turning it round and round very quickly, so that every part receives attention.

**Shaping.**—Shaping boards, consisting of two boards nailed together at right angles, and arranged in tiers on a wooden framework, are used for making the most of the fowls before they are sent up to market. The legs should be tied loosely at the hocks, then the feet and legs bent downwards at each side of the breast, and the wings folded so that they nearly meet and will lie flat. The bird is then held between the hands, and the stern pressed up against the wall, so that the breast is plumped up and the body rounded. When putting the bird in the shaping board, the stern should lie against the back board, and the breast downwards. Heavy weights are then placed on the top, and when the press is full of birds it is kept for six or eight hours till they are perfectly cold and set. This treatment makes the body square and compact. It is the practice of many French poultrymen to wrap up their best birds in linen cloths dipped in milk before placing them in the press, the effect being to soften and whiten the flesh.

**Packing and Grading.**—Much better prices are obtainable when fowls are sent to market regularly graded into sizes and qualities, and where they are well packed. In ninety-nine cases out of a hundred it is appearance that sells a bird, and if regular consignments are made of birds which are well plucked and shaped, having clean legs and empty crops and vents, dealers will soon know where to come. Birds must on no account be sent off before they are absolutely cold and set, and in hot weather it is allowable to finger-draw the intestines through the vent (that is, without making any cut in the flesh). Clean straw, and plenty of it, must be used whether Sussex " peds " or hampers are being used for packing. Attention to detail like this will insure attention even to very small lots of birds, which are as a rule somewhat neglected in favour of the "hundred couple " samples.

**Capons and Caponizing.**—Very many of the birds sold as capons in the Christmas markets have not been caponized, but are simply extra large, heavy birds of the capon class.

The increased table merits of an actual capon lie in the great size of body and bulk of flesh, since (despite many assertions to the contrary) the meat lacks something of the flavour and juiciness of the fatted chicken. Nevertheless the practice means an increase of profit to the large producer, since large numbers of cockerels, which are only of use for the table, are raised fifty per cent. in value; and as the reproductive organs are removed, the male birds can be run on indiscriminately throughout the autumn. If the operation is properly performed on healthy birds, not more than three or four per cent. should be lost. A capon well fed for several months will become twice the size of a cockerel, putting on an immense amount of flesh, and realizing in the Christmas markets from 6s. 6d. to 8s. apiece. It will be seen that the farmer rearing 100 birds which would otherwise be killed young, fetching only 2s. 9d. to 3s. 9d. each, will largely increase his profits even with the four or six months' longer feeding. Only young birds are suitable for the operation, those from six to twelve months old—preferably the former; and before it they must be starved, and afterwards not allowed to perch or run with the other birds for four or five days, being kept in a coop deeply littered with peat moss. It is not proposed to give details of the operation, as we should not advise anyone to undertake it without first watching a skilled operator, and then practising themselves upon dead birds. The effect of caponizing is to retard maturity, and to permit great size and bulk without losing tenderness of meat. If only a few birds are to be caponized, the services of an expert can be obtained at a cost of 1s. or thereabouts per head, but of course the practical farmer will learn the work himself. The cost of caponizing instruments runs to 1 or 1½ guineas.

**Fattening Cockerels on the Run.**—Many farmers who dispose of a large quantity of late-hatched cockerels in the Christmas market (where size rather than quality appears to be the great consideration, in many quarters at least) do not go to the trouble of fatting in pens, but simply fasten forty or fifty birds up in a large barn, giving them a deep bedding of straw, and feeding liberally three or four times a day in troughs standing on the ground. Two meals at least should be of soft food, ground oats and barleymeal, mixed with mashed boiled potatoes and skim milk. This forms an excellent fatting mixture, and one which has the additional merit of cheapness. The food should be mixed into a paste, not a sloppy mass, and put in the trough a little at a time, so that the birds will clear it up readily. Sharp grit must be provided, and milk for drinking. The last feed of the day should be of grain (preferably boiled), giving wheat and maize alternately. As the fowls are protected from weather influences—a very important point in winter fatting—the whole of the food-supply is available for the making of flesh.

**Fattening Ducklings.**—For the most part the "duckers" of Aylesbury use the Aylesbury bird for their early duckling trade, or else an Aylesbury-Pekin cross; but the duck farmer is beginning to realize the value of the Buff Orpington duck for this purpose. Birds hatched in January are ready for the March and April markets. For the first month the diet is usually composed of bran and pollard, with boiled rice, the whole being mixed with the liquor in which meat has been boiled. In the second month meat may be given more liberally, a small quantity only being allowed until the ducklings reach that age, and greaves and barleymeal may be added to the menu. Grit must always be supplied. As much milk as possible should be given, preferably mixed with the soft food as an alternative to the meat liquor. The rough fat must not be fed in lumps, but run through an old sausage-machine or something of the kind ; then, if boiling water is poured on it, it will melt in with the meal. Locust-meal has been recommended to us by several duck raisers, and buckwheat-meal is always relished as a dainty. Peameal is also fattening to a certain extent, and can be used to ring the changes on barleymeal, middlings, or biscuit-meal. Small potatoes make a good fattening food. Ducks will practically cram themselves if they can get at the food, but they should have three good trough meals a day, and at eight weeks, if given a fortnight of this special feeding, they should be quite plump and ready for market. It does not pay to keep them over ten weeks, as the pin feathers then begin to grow. No access to swimming water must be given, and the birds are best confined in small pens in an airy shed, slightly darkened, and well littered down with straw. Do not let the ducklings drink until they have had a good feed, and then remove the dish. Ducklings, like chickens, need to be starved before killing, the necks dislocated, and the body fully plucked, with the exception of the large wing feathers. Straw and clean white paper should be freely used in packing, and the birds despatched in hampers or baskets.

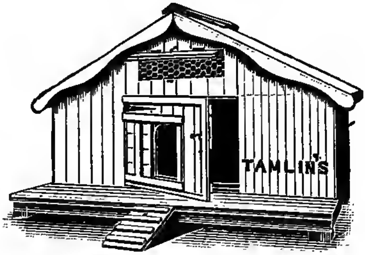

Fig. 22.—" Colnbrook " Duck-House.

**Autumn Ducks.**—For this purpose a larger-sized bird is required, and the Rouen breed is most frequently used. These are kept in small pens in open-fronted sheds, and fed on barleymeal, ground oats, and sharps, mixed with milk, or, for the finest specimens, ground oats and milk solely. Ducks and ducklings stand forcing very well, and do not suffer apparently, from tainted soil or overcrowding to anything like the extent chickens would. Maizemeal is often used to fatten autumn ducks, but should be used sparingly, or greasy yellow fat may be formed. The food is best given in troughs, and mixed to a semi-liquid consistency.

**Goslings and Geese.**—Goslings are usually sold as "green gosling"—*i.e.*, just taken off the run and killed—but Michaelmas and Christmas geese need to be of large size to command the best markets. Fattening should continue for a month before killing, and all those geese shut up together should be killed at the same time, as if only two or three are taken out from a lot the others fret. Any bird which does not respond to the call of the food pail should have a dose of warm castor-oil. The birds should not be shut up in the dark, but left in open-fronted sheds. The food should consist of barleymeal, sharps, ground oats, and middlings, for the morning meal, to which may be added small potatoes, and some mutton fat at the rate of 2 ounces each bird per diem. The fat must be very well boiled down before being added to the food, and one hundredweight of fat should fatten more than fifty geese. The afternoon feed should be of grain, either wheat or maize, and it may be placed in the water troughs, geese preferring their grain out of water. When the grain is eaten, the water troughs must always be removed.

The most humane way of killing is by dislocation of the neck, but, as this is a difficult operation in the case of so strong a bird, it is best to hang the goose up by the legs from a beam, by means of a rope with a noose and running cord, which being tightened, holds the bird effectively in place. A strong pull down and then up will dislocate the neck, and if the bird is left hanging for twenty minutes or so all the blood will flow into the cavity formed by the dislocation, and the body will be beautifully white.

Plucking should be done very carefully, lest the skin be torn, and most professional pluckers sit on a low chair, with a linen apron over the knees to keep the goose clean, and then, holding the bird firmly with one hand, pluck with the other. Geese feathers must be pulled in a straight line from the bird as they grow. The body is fully plucked, with the exception of the neck and small wing feathers, and the legs and feet are usually scrubbed. Geese do not require shaping if they are plump and well grown.

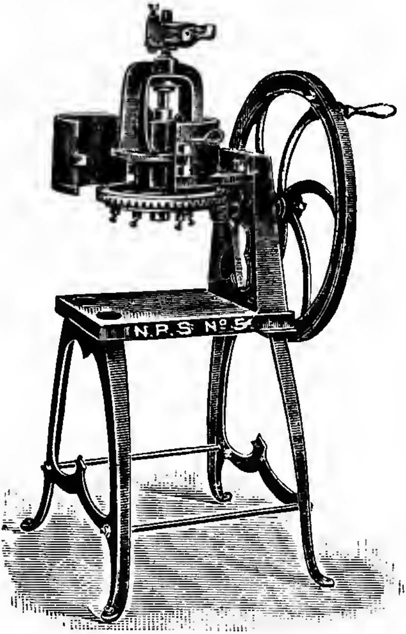

FIG. 23.—GREEN BONE AND VEGETABLE CUTTER.
(New Poultry Syndicate.)

**Turkey-Fattening.**—Birds for fattening, as distinct from stock birds, should be small-boned, with a good flesh-carrying capacity. Open-fronted sheds are again used, and the final fattening takes about a month. The best turkeys are those which have been kept growing without any check from the shell. Any early loss of condition causes a setback in growth which is rarely if ever made up, but good stout birds of healthy constitution will fatten with very little trouble. A week's cramming is sometimes given, but for the most part the month's fattening suffices.

Sussex ground oats, as usual, give the finest results when mixed with milk and fat to a soft but not sticky mass, and fed in troughs, which can stand on the floor. Grit is essential. Barleymeal, potatoes, and boiled swedes, form valuable additions to the menu. Dislocation of the neck, after the preliminary eighteen or twenty-four hours' starving, forms the best method of killing, and the method described above, in the directions for the killing of geese, may be followed. The birds should be plucked while warm, and the feathers pulled out in the same direction as they grow. The whole body is plucked, but not the neck feathers, and great care and a hard pull are required to get the tail and large wing feathers out without tearing the skin, which would seriously lower the market value of the bird.

The birds should be packed between plenty of clean white paper and straw, and as tightly as possible, to avoid bruising. Best prices are obtained for birds of good size and appearance, and straightness of breast-bone. In some markets medium-sized turkeys are in demand, but for the most part large heavy birds will fetch 2d. or 3d. a pound more than a lighter lot of birds.

## CHAPTER V

## DISEASES OF POULTRY

Causes of disease—Precautionary measures—Disinfection—Diagnosis of disease—Common ailments affecting chickens and adult fowls, ducks, and turkeys—Vices of fowls.

EVERY poultry-keeper should have some slight general knowledge of the diseases common amongst fowls, in order to detect at an early stage any signs of indisposition. It has been said that heroic remedies are the best, and that ailing birds should be promptly despatched in order to safeguard their companions. To a certain extent this is undoubtedly true. A very high standard of health ought to be maintained for the sake of other poultry-keepers, and where the constitution of a bird has been seriously impaired, it is a grave fault, in particular, to breed from it. Such breeding is responsible for very much of the poor stock that one sees from time to time; and since we are aware that the tendency to contract certain diseases is hereditary, the practice of putting fowls which are supposed to have " recovered " from tuberculous growths, rheumatism, and diphtheritic roup, into the breeding pen must be condemned severely.

Heroic measures taken during an outbreak of infectious disease are undoubtedly the best and safest, unless the birds are of exceptional value, when it *may* be worth the owner's while to nurse them into convalescence. Chickens which are " bad doers," and constantly ailing while very young, are rarely worth the trouble of rearing. In our early days of poultry-keeping we took the usual amount of trouble over ailing chickens, only to find that disease overtook them as they reached maturity, and that our labour had been in vain. In addition to the worry and trouble of nursing sickly youngsters, there is the fact that they take up much valuable space, and their excreta fouls and poisons the ground, making the rearing of the healthy stock more difficult.

At the same time it would be ridiculous to kill off every fowl which looked a little out of order, since the trouble might be very slight and easily put right.

It is important to remember that disease is an abnormal, not a normal, condition, and that where it exists mismanagement in one form or another is generally at the bottom of the trouble.

**Causes of Disease.**—Overcrowded runs, fouled land, insanitary or insect-ridden houses, impure water, unsuitable food, irregular feeding, lack of green food, lack of sharp grit, too much stimulating food or forcing spices, unnatural warmth and sudden changes of temperature, will all contribute towards a lowered standard of health. Infection may be carried by new fowls which have been purchased from strange yards, and if birds are shown at all they may contract any infectious disease in the show tent.

**Isolation.**—It is a wise precaution, and one which should be invariably observed, to quarantine new purchases for a week or so, during which time any signs of ill-health will usually make themselves manifest. Second-hand fowl-houses or brooders should receive a thorough disinfection and fumigation before being put into use.

Any suspected cases of illness should be isolated at once, and on every poultry-keeper's premises *some* place, however small, should be put aside for this important purpose.

**Disinfection.**—Troughs and water vessels used by diseased birds should be destroyed, unless valuable, in which case they should be soaked in strong disinfectant before being used again. All bodies of fowls which have died from infectious diseases should be burnt, not buried. When a severe outbreak of roup, gapes (*q.v.*), or cholera, has occurred, the tainted ground should be evenly dressed with lime (one hundredweight to each pole of land), put in small heaps, slaked with water, and left until the lime is completely slaked. A pole of land is about 40 square yards, and a convenient method of insuring even distribution of the lime is to place the lime heaps (1 hundredweight) about 6 yards apart, beginning 3 yards from the fence. Winter weather will complete the cleansing. Some authorities recommend a 1 per cent. solution of sulphuric acid, two or three drenchings of the land with a watering-can being given.

**Spare Ground.**—When planning a poultry yard, it is wise to reserve a small piece of land, which can be used as a run for birds whilst under observation, or to which healthy birds can be removed in case of an outbreak of illness.

**Symptoms of Disease.**—It is not a difficult matter, even for an inexperienced person, to observe when a fowl is ailing. The comb may be taken as the barometer of health, since in sickness it becomes pale, or dark mauve, instead of a healthy red, and looks flabby and wrinkled instead of firm and vigorous. Ruffled feathers, lack of appetite, or abnormally large appetite with emaciation, extreme heat of body with sensitiveness to touch in any particular place, odour from the breath, irregular breathing or a whistling sound, sneezing or coughing, or running at the eyes or nostrils, and loose, slimy, or blood-stained evacuations, are all possible symptoms of different ailments. An ailing fowl will, as far as possible, avoid the society of its companions, and will crouch mopily in a corner. If at any time a bird does not come running up with the others for its food, it is always well to pick it up and examine it carefully.

**Diagnosis of Disease.**—It is well to remember that one symptom must be balanced against another, and not treated separately. A cough, for instance, may proceed from gapes, from an ordinary cold, from some obstruction in the windpipe, from bronchitis, or from tuberculosis, and it would not be of much use to treat only for a cough without inquiring into other bodily conditions.

Again, a fowl may become thin and pale, and appear to be wasting away. In all probability there will be tubercular trouble, but, on the other hand, it may be simply due to the presence of worms, a frequently unsuspected cause of ailment.

**Simple Medicines.**—It is well to have a stock of homely remedies on hand, in order that illness may be checked at its beginning, and the following should find a place in every poultry-keeper's medicine chest: Castor-oil, sweet-oil, glycerine, camphorated oil, Epsom salts, Jeyes' fluid, Douglas mixture, roup pills or roup powder, tincture of iodine, linseed, vaseline, Glauber's salt, Parrish's chemical food, and permanganate of potash. With these remedies the majority of poultry diseases can be successfully fought.

**Post - Mortem Examination.**—If a fowl die suddenly (other than from an accident or some very obvious cause), it is wise to have the body opened and examined, for future guidance. It is, of course, possible to make a rough and ready examination oneself, and, unless the cause of death has been of an obscure nature, it is as a rule discovered by this means. But to successfully conduct a post-mortem examination is difficult for the ordinary poultry-keeper, and it is really the wisest plan to submit the body to an expert, together with all information likely to be of use.

Most of the poultry papers have experts attached to their staffs who will for a small fee inquire into the cause of death. The body should be sent off immediately, so that no signs of decomposition present themselves. Any symptoms noticed, foods used, general treatment of the birds, kind of land and nature of fowl run, should be described as fully as possible, in order that the expert shall not be working absolutely in the dark.

## DISEASES OF CHICKENS.

Under this heading we propose to discuss those ailments which are peculiar to chickenhood, and also those which, whilst they appear in adults as well as in young birds, require particular attention in the latter case.

**Cramp.**—In the case of young chickens this is caused by damp, and is a common trouble in the early months of the year. It must not be confused with leg weakness, from which it differs a good deal, though the symptoms are rather alike. The first symptoms are failure of power in the legs, which often swell, and contraction of the claws. The chicken cannot walk steadily, and as the claws get more doubled up the bird seems actually to be walking on the knuckles. Whole batches of chickens are often lost in this way during a wet season. Warmth is an essential, and a thickly-bedded dry floor (not of wood, if possible), is very advisable. Peat moss, finely granulated, is an excellent thing for keeping chickens' feet dry. Nourishing food should be given, and the claws and legs massaged as frequently as possible with oil or embrocation.

Other causes of cramp are overfeeding and overcoddling : the cramp in these cases being of a gouty nature. If the birds get overfed, uric acid accumulates in the tissues, and they are too lazy to work it off. For this trouble the best remedy is 1 grain of salicylate of soda for each chick, together with 2 grains of Epsom salts, twice a day. The legs must be massaged with oil, and the quantity of food given must be reduced, so that the chickens run about and work, instead of staying under the mother hen and becoming overheated.

Chickens reared in a greenhouse (one of the worst of *all* places for the purpose, but one which many people are fond of using) are very apt to suffer from this complaint. They should be at once taken out into the air, to an open run in which peat moss or ashes have been strewn. For a few days they should be kept on limited rations, so that they become hungry and active. In the majority of cases the cramp will disappear.

**Leg Weakness.**—In young stock there are two causes of this trouble. The first one is improper feeding—*i.e.*, a dietary in which there is a lack of bone-making material, or which is of too forcing a character. Young cockerels, and those of the long-legged varieties in particular, are very prone to leg weakness, if their food is not correctly balanced. Parrish's chemical food is about the best tonic to be found for this trouble, and may be given liberally. We personally have had no trouble with leg weakness in our own stock since we began using Phosto, a liquid preparation of phosphates (not a medicine). It can be given with perfect safety after the chickens are a week old, and is equally good for adult stock.

Bonemeal should be dusted into all the soft food supplied, and oatmeal and ground oats should not be omitted from the daily dietary. Want of green food often causes leg weakness in young chickens, because the whole system is lowered and growth is checked. Grass contains a good deal of much-needed lime.

The other common cause of leg weakness, where the bird falls about and is unable to lift itself on to its legs (the claws, however, not being contracted as in the case of cramp), is the keeping of young chickens on wooden floors, which results in the atrophy of certain muscles. Where chickens have plenty of ashes, some peat moss, or an uneven floor on which they can roost, this form of leg weakness speedily disappears.

**Bowel Troubles.**—Diarrhœa is one of the plagues of chicken-rearing, but may for the most part be avoided by careful treatment and feeding. Some of the commonest causes are impure water, soured food, food given too hot or in too sloppy a condition, too much fluid given in addition to that contained in the soft food, sudden changes of temperature, overheated brooders, and irregular supplies of green food.

Slight cases can be treated by *small* doses of castor-oil, which assists in expelling the fœtid matter from the system.

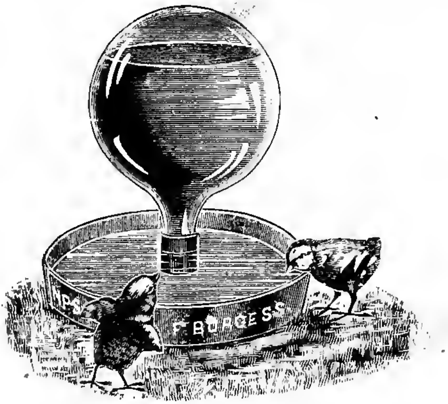

Fig. 24.—Chickens' Drinking Fountain.
(New Poultry Syndicate.)

after which several meals of rice, boiled in milk over which powdered chalk has been sprinkled, may be administered. If caused by very wet or chilly weather, a drop of camphor essence over each feed for a day or so will usually check it. For more obstinate cases chlorodyne should be given—not more than 2 drops if the chickens are under a week old, nor more than 5 drops for those under a fortnight. The dose may be repeated every three hours until the diarrhœa is checked. Hard-boiled egg very often causes constipation, and that in its turn causes diarrhœa.

**Stoppage.**—Stoppage is a very common trouble amongst young chickens, and hard matter is seen to be collected round the vent. The affected part should be bathed with warm water until all the dried matter comes away, and should then be rubbed with vaseline or warm oil to prevent a similar occurrence. A few drops of sweet-oil mixed in the soft food will benefit the system, or a little common treacle will answer the same purpose.

**Worms.**—A frequent reason for chickens doing badly. Half-grown stock is particularly subject to the complaint, and a serious setback in growth is often the result, if treatment is not applied. Birds in this condition waste away rapidly, and yet have abnormal appetites. They should be fasted for twenty-four hours, having nothing but a little water to drink. At the end of that time administer 1 teaspoonful of roup powder for every two birds, the powder to be mixed with a little fat and formed into small pellets. The birds, being hungry, will eat ravenously, and at the end of two or three hours a meal of warm soft food, in which a little stewed linseed has been mixed, may be given. The next morning feed may have some Epsom salts (1 teaspoonful to every four birds) mixed in with it, to expel worms killed by the roup powder.

For full-grown birds affected with worms the Board of Agriculture recommends pills of thymol (1 grain mixed in a little dough), given twice daily. As far as possible the droppings of these fowls should be scraped up and burnt.

**Gapes.**—This dreadful disease carries off hundreds of young chickens every year. It is caused, as is now well known, by the invasion of the red gapeworm, which attaches itself to the surface of the windpipe. If extracted untorn from the chicken, it is observed to be Y-shaped, this curious shape being due to the male and female worm being attached, as almost always found.

The symptoms of gapes are a general look of weakness and debility, roughness of feather, coughing and sneezing, standing about with closed eyes, and the characteristic "gape." Usually there is also frothy saliva round the mouth and nostrils. Among the common causes of this disease are—Overstocking the land; rearing chickens for several consecutive seasons on the same ground; the presence of ticks upon the heads of chickens; low-lying and marshy ground used for rearing (which appears to favour the growth of the gapeworm); and allowing chickens to drink dirty water from dirty vessels.

The best preventives of the disease are plenty of fresh clean land, pure water, the addition of garlic and chopped onions to the daily bill of fare, and the anointing of the head of each chicken with the following ointment:

| | |
|---|---|
| Mercurial ointment .. .. .. | 1 ounce. |
| Sulphur .. .. .. .. | ½ ,, |
| Crude petroleum .. .. .. | ½ ,, |
| Lard .. .. .. .. .. | 1 ,, |

Healthy birds should be immediately separated from the others, and removed to fresh ground, the land on which infected birds are running being afterwards drenched two or three times with a 1 per cent. solution of sulphuric acid. As regards treatment of infected birds, they should be killed and burnt, and no bodies should ever be buried. All drinking vessels should be scalded every week. A feather dipped in eucalyptus-oil or oil of cloves should be thrust down the throat of the bird (taking care not to suffocate the sufferer), turned round, and withdrawn, when the bright red worms will be seen adhering to it. They should be at once burnt, together with the feather. Camlin is an excellent remedy, and should be used in conjunction with the feather treatment.

*No land on which gapes has made its appearance should be used for chicken-rearing for fully two years*, and in the interval it should have a good dressing of quicklime, and be allowed to lie fallow or to have a good growth of grass upon it.

## DISEASES OF ADULT STOCK.

**Apoplexy.**—This is not uncommon among fat old fowls, especially those of the heavy varieties. Rich food or overfeeding may also induce it in young birds. In the case of a slight attack, put the head under a flow of cold water, apply ammonia to the nostrils, and pen the bird up, keeping on very low diet for a few days. A dose of Epsom salts will help to put matters right. If a bird, otherwise in good condition, is seen to stagger unsteadily about, it should be penned up and kept on low diet, as this may ward off an attack.

**Bronchitis.**—Sudden changes in temperature, or a chill contracted on a journey, will often cause this ailment, soon detected by the heavy, quickened breathing and cough. The bird should be kept, if possible, in a warm, steamy atmosphere, and dosed with 3 drops of ipecacuanha wine and a few drops of warm glycerine. Sometimes bronchitis becomes chronic, but if not severe the bird will be all right in other respects. Some cough lozenges dissolved in the drinking water, and a teaspoonful of warm glycerine now and then, will prevent the bird from getting any worse.

**Bumble-Foot.**—There are two opinions as to the cause of bumble-foot, the one being that daily jumping from the perch on to a hard surface causes a hard growth under the foot; the other, that it is caused by the presence of a parasite. In any case, it is wise to brush paraffin over the perches used by any fowls suffering from the complaint. A bird in an unhealthy condition may scratch the ball of the foot and set up inflammation. If the swelling is hard and horny, resembling a simple corn, it may be pared away, and the foot anointed with salicylic ointment.

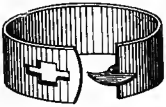

FIG. 25.—MARKING RING FOR POULTRY.
(Hebditch.)

If, however, the swelling is soft, and develops into an abscess, the bird must be put into a coop bedded thickly with peat moss. The place should be well painted with iodine, and if no relief is given it should be poulticed, and then cut open and the matter squeezed out. Wash the wound with Jeyes' fluid, and dress with Calvert's carbolic ointment, bandaging the foot till the place is healed.

**Cholera.** — This highly infectious and generally fatal disease is not very common in England, though we have had outbreaks, and a hot summer is the most usual time for its appearance. Impure food or water, a bad drain or tainted ground, may set up the complaint, which much resembles enteritis. The important thing when the disease once makes its appearance is to isolate the birds immediately, collect and disinfect all infected droppings, burn all dead bodies, and apply preventive measures to the healthy stock, spreading them out in small lots.

The symptoms are—Blood in the evacuations (which, first being of a greenish-white colour, become afterwards for the most part blood and jelly), great thirst, pale or very dark comb, a huddled and drowsy appearance, and occasionally convulsive movements. It is rarely that birds attacked by cholera can be cured, and it is wiser to kill them and burn the bodies, and concentrate all energy upon preventing the spread of the disease. The water-supply should be stopped, and boiled water given instead, in which a little iron solution has been placed. Thick barley-water will prevent the perforation of the intestines, and sweet-oil will serve the same purpose. If perforation once begins, there is small hope of saving a bird. Tainted ground must be purified with lime or sulphuric acid, as described on p. 114.

**Colds.**—These must be carefully watched, or they may develop into the dreaded roup. Bad weather, exposure to wind or rain, and draughty houses, will cause colds, the symptoms being wet eyes and nostrils, coughing or sneezing, and ruffled plumage. If the slightest sign of matter is present about throat or nostrils, or if the breath is offensive, isolate that bird at once and treat for *roup*. Give warmth, nourishing food, and a good tonic, to the other sufferers with a little roup-powder in the drinking water ; 5 drops of camphor for each bird mixed in the soft food will often check a slight cold.

**Crop-Bound.**—The symptoms of this are the usual evidences of "out-of-sorts," and a swelling, hard or soft, in the region of the organ. Irregular feeding, overfeeding after a long fast, twisted grass, a piece of bacon rind, or other foreign substance in the crop, are common causes. When the crop is only slightly distended, and no hard matter is felt, gentle kneading with the finger, followed by a small dose of warm castor-oil, will give relief. No food should be given for eighteen or twenty-four hours, but plenty of water (in which a little Epsom salts has been dissolved) may be supplied.

Where the lump feels hard, and the crop is much distended, a slight operation may be performed. First remove a few of the breast feathers, so that the skin can be seen; then make a small incision, with a *boiled* penknife, through the outer skin of the breast, and then through the crop itself. If the cut is made near the top, there will be no danger of cutting through a large bloodvessel. Next clear out the crop with a small teaspoon, and then wash it out with boiled water in which a few grains of potassium permanganate have been dissolved. When sewing up the wound, use a boiled needle and silk thread dipped in Jeyes' fluid. Sew up the crop first, and then the outer skin, and tie each stitch separately. When the skins are sewn up, rub some Calvert's carbolic ointment over the place, and keep the bird quiet in a coop for a few days, feeding on soft food made fairly stiff, giving no fluid to drink for six hours, until the wound is beginning to heal up.

**Soft Crop.**—This is one of the results of overfeeding or improper feeding, and is a watery condition of the crop, which becomes full of dirty fluid. Twice a day the fowl should be held upside down, and the crop squeezed gently, when the fluid will come out of the mouth. Keep on low diet for a while, and administer a charcoal pill twice a day for a week. Iron in the drinking water will help to tone up the system.

**Dysentery.**—Diarrhœa and dysentery attack adult fowls just as they attack chickens, but the chances of saving them are much greater. Dysentery closely resembles both cholera and enteric, and the evacuations of a jelly-like character are tinged with blood. As in the case of cholera, the birds should be isolated, and should have as much barley-water as they will drink, with no solid food for two or three days. Olive-oil may be given with safety, but not castor-oil, as the violent action of this might set up perforation. Three drops of laudanum will ease the pain, and on recovery Parrish's food may be given to tone up the system. Sick birds are best penned in coops with a thick layer of peat moss on the floor, as this is both highly absorbent and a deodorizer.

**Disease of Egg Organs.**—When there is definite disease of the egg organs, the fowl had better be killed outright in the majority of cases. Where an egg lacking all white and shell is laid (unless a sudden fright or a fall has been the cause), disease is likely. Blood-spots in eggs may be caused by condiments or too much meat, and are not commonly of any importance. Black spots, however, are as a rule a sign of a diseased ovary, and the hen which lays such eggs should be killed. Overfeeding is as a rule the cause of abnormal eggs—*i.e.*, those which are unusually large or small or of curious shape. Fright, or lack of shell-forming material, will cause the production of shell-less eggs.

**Egg-Binding.**—This occurs not infrequently, and must be quickly dealt with if the hen is obviously distressed. The symptoms are—The hen going about with the tail depressed, haunting the nest-boxes, with sensitiveness on the left side near the vent, where the lump can usually be felt. Old hens are much more liable than pullets and young birds to this trouble, partly because the organs are becoming naturally weaker with age, and partly because, the oviduct being widely distended, there is a tendency for two yolks to get together to form a single egg. An old hen, becoming fat and lazy, lays fewer eggs, but of larger size. If taken in time, a pill of soot and soap twice daily will often effect a cure, and we have seen warm treacle recommended as a preventive. There should be as little interference as possible, and this should not be hurriedly applied, lest the egg be fractured, in which case serious consequences may follow. If, however, it is seen that the hen is obviously unable to get rid of the egg, she should be held over hot steam to soften the vent, and a feather dipped and soaked in oil should be worked gently round the passage to soften the walls. The hen should then be left on the nest for an hour or two, and if by that time the obstruction is not removed the operation should be repeated.

**Fracture.**—If in a case of this kind the egg has become fractured, the greatest care must be exercised as, if fragments of shell remain behind and there is escape of egg substance, inflammation, and even gangrene, may be set up. The vent should be soaked with oil, and any portion of shell which can be seen should be gently withdrawn until, with gentle movements, the whole can be removed. It will usually come away together. After the withdrawal a good dose of castor-oil should be administered, and the fowl kept quiet and away from the other hens for a little.

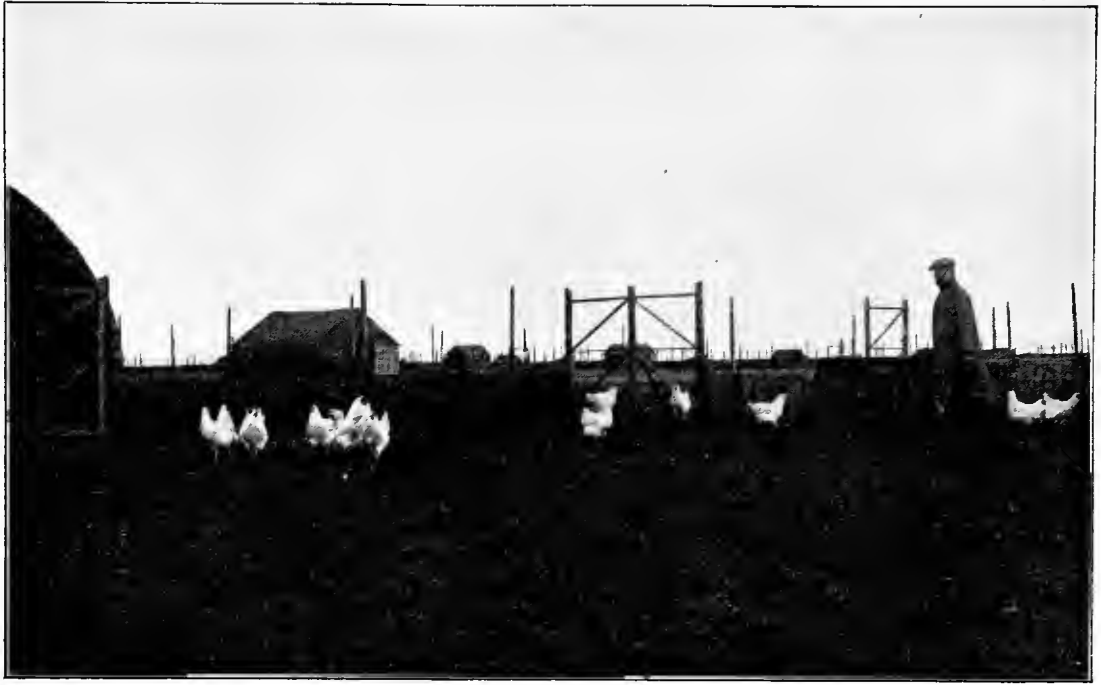

Fig. 26.—Winter Layers on the Yorkshire Farm of Mr. and Mrs. Pyne, Ravenscar.

**Egg Cramp.**—This is a common complaint among pullets which have just commenced laying, and appears like paralysis of the legs. It is caused by the muscular resistance of the strong walls of the oviduct to the eggs as they pass along. The only thing to do is to keep the hen perfectly quiet, to feed sparingly, and administer a dose of castor-oil. In old hens it may be caused by exhaustion after a long spell of laying.

**Prolapsus.**—The common name for this among poultry-keepers is "down behind," and is a condition of muscular weakness after prolonged laying, on which a portion of the intestines protrude. A hard lump can often be felt. The vent should be bathed with a strong infusion of cold tea, the part gently pushed back and held in place, repeating the operation frequently. Low diet is essential, that the production of eggs may be checked.

**Favus.**—This serious and highly contagious disease is caused by a minute vegetable fungus which attacks the human subject as well as poultry, dogs, cats, etc. Great care must be exercised in handling fowls suffering from it, as any scratch on the hand would be enough to set it up in the operator. Frequently the disease is brought into healthy yards by fowls bought in public markets and sales.

In its first stage it is a disease of comb and wattles, appearing as dirty white spots on the comb, which afterwards form crusts, the skin underneath being red and sore. If not taken in time, it may spread to the head and neck, causing loss of feathers, and if it has reached that stage it is better to kill the fowl, as it will probably die of weakness.

Disinfectants must be freely used when treating the bird, which should be quarantined, fed with plenty of greenstuff, and have Epsom salts in the drinking water. The crusts should be washed with vinegar, followed up with tar and sulphur dressing. The Board of Agriculture recommends an ointment of 5 per cent. nitrate of silver in lard, to be well rubbed into the affected places. All crusts removed must be burnt, and rigid cleanliness observed.

**Frost-Bite.**—In winter-time this is not an uncommon trouble, especially in the North of England, and among the large-combed varieties, which ought to be sheltered as much as possible and forced to take plenty of exercise, since frost-bite is largely due to defective circulation. For the most part treatment should be preventive, the comb being rubbed daily with a little vaseline.

If there is snow on the ground the comb should be briskly rubbed with it, but if no snow is available the frozen comb should be thawed out by means of tepid, *not* warm, water. According to American authorities, a valuable ointment is a mixture of—

| | | |
|---|---|---|
| Lard .. .. .. .. .. | 2 | ounces. |
| Quinine .. .. .. .. | 1 | ,, |
| Kerosene .. .. .. .. | 2 | ,, |

**Gastritis.**—As a rule a fowl suffering from gastritis dies quickly, unless prompt measures are taken. Highly spiced foods, chills, a blow, or some poisonous substance, may cause it, and the symptoms are those of obvious pain, sickness, thirst, and feverishness. Pen in a warm coop, give small quantities of nourishing food with no spices of any kind. A little chlorodyne in warm bread and milk will soothe. All drinking water should have the chill taken off it.

**Diseases affecting the Liver.**—Liver disease itself is one of the worst diseases the poultry-keeper has to face, and, unfortunately, it appears to be more common than formerly. There are, however, several other forms of liver trouble, some of which are slight and easily remedied, and we will deal with them first.

**Congestion of the Liver.**—This is the simplest form of liver trouble, and may be nothing more than sluggishness caused by high feeding and lack of exercise. The symptoms are general sluggishness of movement with rather yellow evacuations, and sometimes lameness. Rations should be reduced, plenty of sharp grit supplied to enable the liver to relieve itself gradually, and a liberal allowance of green food (with the exception of lettuce, which contains opium, and tends to sluggishness). Epsom salts or Glauber's salt added to the drinking water will complete the cure as a rule.

**Inflammation of the Liver.**—This is a more acute kind of illness, and is usually followed by death unless the attack is quickly dealt with. The symptoms here are more acute, the bird, not moving about much, showing a good deal of tenderness and pain, especially in the region of the right leg. The skin usually shows rather yellow, and the evacuations are yellow, sometimes tinged with blood. If the bird is held over a kettle of boiling water, the steam will relieve the inflammation. In addition, 10 drops of chlorodyne may be given. Bread and milk in small quantities may be fed while the attack lasts, and after it is over careful dietary should continue, with an iron tonic and Epsom salts in the drinking water.

**Liver Disease.**—Overcrowding, insanitary conditions, inbreeding, rich food, lack of exercise and greenstuff, are all contributory causes in setting up this dread disease, which is in reality tuberculosis. Liver disease is generally marked by emaciation, "going light" as it is often called, loss of appetite, listlessness, rough plumage, lameness, tenderness in the region of the liver, and dark-coloured comb and wattles. The bacilli are considered to enter the body of the fowl either by means of the food or from the droppings of affected birds; but unless there is a predisposition to the disease it will not get a firm hold. For that reason diseased birds must never on any account be bred from; and though apparent cures may be made by removal to fresh surroundings, feeding on meat and oatmeal, and the administration of cod-liver-oil and drugs, such cures are emphatically not worth the trouble they entail, and tubercular birds are far best out of the way. All bodies must be burnt and buried in quicklime, and the tainted runs and the houses must receive a thorough purification and disinfection.

A post-mortem examination reveals the characteristic appearance of the liver known as "spotted liver," the liver being studded with round tubercles varying in size, which can be separated from the surrounding tissue, but which are found right through the liver and not just on the surface.

The lungs are less frequently affected than the liver and intestines. When once the disease gets a footing in the flock, drastic measures are the best—*i.e.*, kill off all the birds, disinfect the premises as thoroughly as possible, and start with a fresh stock from a yard that is known to be free from disease. Hens in an advanced stage of the disease do not lay, but, still, there is always the earlier possibility of transmission of disease through the egg to be guarded against.

**Roup.**—There are two varieties of this disease—one much more serious than the other, and more highly infectious.

Catarrhal roup is much more infectious than a mere cold, but frequently commences as such, with running from eyes and nostrils, sneezing, and coughing. The catarrh becomes, however, more acute, and the discharge grows more sticky, especially from the eyes, and has a bad smell. In a later stage the discharge may become cheesy, but does not form a membrane as in diphtheritic roup. All affected birds must be isolated, and a good roup-powder mixed in the drinking vessels of both healthy and ailing birds. The beaks, mouths, nostrils, and eyes, of such birds must be washed several times a day, using either a strong solution of permanganate of potash or of peroxide of hydrogen and water (equal parts). Keep the hens in dry pens, well bedded down with granulated peat moss, and give a nourishing diet. Tainted ground, as in all other infectious diseases, needs to be thoroughly cleansed before using again.

In order to guard against outbreaks of roup, shelter against cold winds and driving rain must be provided, and sudden changes of temperature guarded against as far as possible.

**Diphtheritic Roup.**—This is of an even more contagious nature, the particular symptom being the appearance of a yellowish membranous growth, forming raised patches in the mouth and throat. Even in cured cases of roup and diphtheritic roup the disease takes such a hold on the systems of affected birds that they should never be used in the breeding pen. For the most part, affected birds, unless of value, should be killed off, as endless loss and trouble may attend the "patching up" of some few birds of comparatively small value.

If a cure is being attempted, the membranous matter must be removed as it forms, and the places swabbed with permanganate of potash (a strong solution), or a 10 per cent. solution of salicylate of soda, as recommended by the Board of Agriculture. Mr. Lewis Wright, in his "Book of Poultry," advises the following dressing :

| | |
|---|---|
| Carbolic acid | 1 drachm. |
| Sulphurous acid solution | 3 drachms. |
| Tincture of perchloride of iron | 4 ,, |
| Glycerine | 4 ,, |

Nitrate of silver is another excellent thing for touching the affected parts after the growths have been scraped away with a sharpened piece of wood.

All swabs used in dressing should be burnt after using. A remedy much used in France, and quoted by the same eminent authority, consisted of equal parts of tar and turpentine, which is burnt in the hen house at night, the door being closed. This appears to be effective if employed at an early stage, the membranous growth being detached. It is said to check infection to the others.

When convalescent, nourishing foods and tonics must be supplied liberally.

**Scaly Leg.**—A parasite, the itch mite, is the cause of this unsightly ailment, the insect burrowing under the scales of the leg, which in old fowls are more wide apart and distinct than in young birds. As the disease is very contagious, all perches used by infected birds must be well scrubbed with paraffin and soft soap put on hot. Quite young chickens can also contract it if the hen which is brooding them is suffering from scaly leg.

The appearance of the birds' legs is peculiar, the coating of white scurf which covers them being sometimes so thick that it forms lumps ¼ inch in depth; and if the bird is neglected the trouble will spread to the joints, and the affected limbs may actually drop off.

A parasiticide should be employed, the legs and feet being thoroughly cleansed first of all by scrubbing with hot water, and afterwards with vinegar, using a rather stiff brush. One good parasiticide is made up of—

| | |
|---|---|
| Creosote .. .. .. .. .. | 1 part. |
| Camphor .. .. .. .. .. | 1 ,, |
| Oil of turpentine .. .. .. | 7 parts. |
| Sweet-oil .. .. .. .. .. | 3 ,, |

Another, equally good, is made by dissolving 4 pounds of soft soap in 1 quart of water, adding 1 quart of paraffin to the solution. The whole should be well shaken up, and then allowed to cool and settle, drawing it off as required.

When applying either of these lotions, the fowl should be held on its back with the feet uppermost, so that the liquid can get right under the scales to the affected part.

**Vent Gleet.**—This is, fortunately, not a common trouble, as it is rather an unpleasant one to deal with. As a rule the cause is a broken egg in the oviduct, which causes septic inflammation; and though it always begins with a hen, the infection, once started, may be carried by the male bird right through a whole yard.

Any hen found to be suffering from vent gleet should be at once isolated, and the male bird also kept apart until he can be examined.

The first symptoms are redness and swelling, followed by a milky discharge with an extremely offensive smell. This dries, and forms crusts which should be dusted with iodoform. A low diet is necessary, with Epsom salts and an injection of nitrate of silver in solution twice daily. If the fowl does not appear to be recovering after a week or two of treatment, it should be killed. Care is necessary when treating the bird; gloves should be worn, and the hands of the operator carefully disinfected before eating, or touching any part of the face or head.

**Swollen Wattles.**—These may be either hard or soft in nature, and where there is a hard swelling with no fluid iodine may be painted over the surface. If the swelling is soft and contains fluid, it must be lanced, and the matter and fluid squeezed out, washing afterwards with a solution of permanganate of potash.

## DISEASES OF DUCKS.

Ducks and ducklings are very much less liable to disease and infestation by parasites than are fowls, probably because of their water habits. Ducklings are subject to colds and cramps if they are allowed to be out in a shower of rain before they are fledged, or if they are allowed in cold water too soon (this when they are hen-hatched).

Ducklings also suffer from a kind of heat apoplexy or sunstroke if they are not kept out of the hot sun, but with these exceptions they are remarkably healthy.

Old stock ducks, if overfed, are also prone to apoplexy, commonly called "staggers," because the bird reels about and cannot maintain its balance. Treat as in the case of fowls.

"Bad eye" is a duck complaint occasionally met with, caused by overcrowding on sawdust bedding.

## TURKEYS.

**Intestinal Troubles.**—Young turkeys are prone to diarrhœa and intestinal irritation, and require very careful feeding on this account, avoiding sloppy food or new grain. If diarrhœa makes its appearance while the birds are still having egg feeding, the egg should be omitted from the menu, and chicken-meal, scalded and mixed with rice boiled in milk, substituted, sprinkling a little powdered chalk over the meal.

**Swelled Head.**—A chilly or windy day following hot days is very apt to cause this. In order to prevent it from spreading, put a little camphor in the drinking water of the other turkeys, and isolate the sufferer. The swollen face should be bathed with lukewarm water containing Jeyes' fluid, and fomented with hot water in which poppy-heads have been infused. If the matter can be squeezed out, so much the better, and the bathing can be continued. If the swellings have become hard, an incision with a boiled penknife may be necessary, after which the place should be well rubbed with Calvert's carbolic ointment or carbolized vaseline. A little roup-powder should be put in the soft food, and small doses of Epsom salts given for three or four days will help to clear the system.

**Catarrhal Roup.**—The symptoms in turkeys are very much the same as in the case of fowls—*i.e.*, feverishness, thirst, whity-yellow substance forming in the throat and mouth, together with swelling and inflammation. The causes both of this and of swollen face are fairly similar —insanitary, overcrowded quarters, with lack of ventilation. If turkeys do not roost in open-fronted houses they are peculiarly liable to disease.

The cheesy matter must be scraped away, and the places then swabbed with peroxide of hydrogen and water (equal parts) ; 30 grains of Epsom salts must be given daily in the soft food. All houses and runs must be thoroughly disinfected, and the birds well sprayed with potassium permanganate before being put back with the rest of the flock.

**Black Head.**—This is caused by a low form of parasitic life, and may be contracted by turkeys at any time of life, one attack apparently giving no immunity at a later period. It is thought by many eminent authorities that the common hen (which occasionally contracts the disease, but rarely dies from it) acts as a carrier of the organism; and if that is definitely proved to be the case, turkeys and hens should not be allowed to mix together at all. In America it has had disastrous results; and though until late years it had never been known in England, it has, unfortunately, made its appearance. The name was given

FIG. 27.—A LARGE INTENSIVE HOUSE ON MR. TOOVEY'S FARM AT KING'S LANGLEY.

to the disease because at a certain stage the turkey's head was quite black. The symptoms are drowsiness and refusal to eat, with liquid evacuations of a yellow colour, the evacuations being the main source of infection.

The liver is the main region of the disease, and the difficulty, for the average breeder, lies in the fact that the disease is not always clearly indicated until it has obtained a firm hold. A post-mortem examination is necessary directly a dubious case of illness occurs.

Up to the present time no curative treatment has been found which can be claimed to be wholly successful, and it is best to concentrate attention on disinfection and prevention. Dry, sandy soils appear to prevent the disease to some extent, whilst heavy land seems to conduce to its development. Slaked lime should be freely used in the yards, the houses and roosts, and any other buildings to which infected birds may have or have had access. Rearing should not be attempted for a full six months after the disinfection. When applying slaked lime whilst hot to houses, etc., care must be taken to protect the eyes against accidental splashing.

**Chicken-Pox.**—This ailment frequently attacks growing turkeys, and is a form of scrofula which is highly infectious. The heads of the turkeys become covered with large yellow sores, full of discharging matter, which form scabs. Each bird must be dealt with separately, the places being bathed with a strong solution of permanganate of potash, and then painted with Jeyes' fluid. The birds must be kept on fairly low diet, and have Epsom salts once a day. One of the commonest causes of this disease is overfeeding, and much feeding of maize, which is too starchy for young birds.

## VICES OF FOWLS.

**Egg-Eating.**—This is, unfortunately, a common vice, which needs dealing with at once, as, unless the culprit is discovered and checked, she will teach the habit to the other hens. Busy hens seldom contract bad habits, and if plenty of exercise is allowed, and a liberal supply of green food and broken oyster-shell provided, there will be less inclination to bad habits of this kind.

To detect the offender, an ordinary hen's egg should be emptied of its contents, and through the hole treacle should be poured, and the hole sealed up with candle wax or a piece of eggshell attached by seccotine. The egg must then be put back in the nest, and the egg-eater will shortly be detected by having the beak covered with the sticky contents.

To cure the egg-eater, many writers advise that a small piece should be cut off the point of the bill (being careful not to cut too deep); but other remedies should be tried first, such as filling the shell of an egg with mustard and cayenne. If this fails, the offender should be killed, as such a hen will teach others the habit, to the serious loss of their owner.

**Feather-Picking.**—Opinions differ as to the cause of this tiresome habit, some authorities attributing it to a lack of green food, or idleness on the part of the fowls; others, to the ravages of a tiny insect in the quills of the feathers, causing great irritation. We are inclined to put it down to sheer mischievousness. One wily old hen will discover that there is a particularly attractive and "meaty" flavour about the roots of the feathers, and proceed to start work on her companions, who soon learn to retaliate. If only one hen is practising the habit, her neck should be wrung without delay; but if a number are engaged, the necks and rumps (and legs, if the fowls are of a feather-legged variety) must be dressed with a bitter mixture. Lard and creosote rubbed into the feathers at the roots, or a strong solution of quassia, or a mixture of bitter aloes and lard, are all efficacious measures.

If the fowls are kept busy and active scratching for buried grain, and if vegetables, such as cabbage heads or a swede cut in half, are hung above their heads so that they must jump to reach them, they will not have time to contract bad habits.

## CHAPTER VI

## BACKYARD AND SUBURBAN POULTRY-KEEPING

Opportunities for the small poultry-keeper—Causes of failure—Suitable breeds—Housing and feeding—Keeping the run sweet—Profits of domestic poultry-keeping—Egg records—The balance-sheet—Chicken-rearing—Duck-fattening—The day-old chick trade.

It is very gratifying to note the large increase year by year in the number of residents in towns and suburbs of towns who are taking up poultry-keeping on a small scale for the purpose of supplying their home tables with eggs and chickens, and who are not only keeping their birds without loss, but who are actually making good profits out of their work. With the advent of sound practical teaching on the subject, and the gradual growth of interest among the general public, it is, however, more wonderful that a still larger number of householders have not embarked upon poultry-keeping. If every person who possessed a small grass run, or even an earth backyard, were to keep fowls just for their own use, we should hear a good deal less about the imports of fresh eggs and poultry which enter this country. The demand for fresh eggs in our large towns is still enormously in excess of the supply, and is likely to be for many years yet; and if all the waste bits of ground up and down the land on which fowls could be kept with excellent results could be added up, it would surprise most people to learn what opportunities are being thrown away every year. Many people are deterred by the imagined difficulties and troubles of looking after live-stock, but the trouble is really a pleasure, and a hobby like this is of great value to many a jaded city worker.

**Special Advantages of the Small Poultry-Keeper.**—The householder who intends to take up poultry-keeping for home purposes has many advantages peculiar to his position. He has no extra rent to pay for his land, so that his birds do not have to meet that expense before they yield a profit; his food bill can be kept at quite a low figure by the skilful use of home scraps, and those of friendly neighbours who do not keep fowls, and who will readily save the household odds and ends which would otherwise go into the fire; hotels and restaurants will give away or sell at a low price their very considerable "leavings"; greenstuff sufficient for a few fowls can be obtained gratis from the local greengrocer, and if a small regular order for lights, liver, etc., be placed with the butcher, he will often throw in a few extra tit-bits; while litter for house and runs can be obtained from neighbours' gardens when the leaves are falling, or, for next to nothing, in the shape of straw from stores where goods are being unpacked. Again, there is no difficulty in disposing of the produce, the average housekeeper being only too delighted to purchase genuine British new-laid eggs which are above suspicion.

**Where the Amateur often fails.**—Of course there are failures from time to time among those who are just beginning their backyard or suburban poultry-keeping, but in nine cases out of ten where these have occurred error in management has been the cause, and it is wiser, where success is not forthcoming, to examine into one's methods, and painstakingly worry out the reason, than to throw up the sponge in disgust and loudly affirm that "poultry doesn't pay." Poultry can be made to pay, and *does* pay even in a cramped backyard run if proper methods are adopted, as we have ourselves seen by the perusal of many a pleasing little "backyard balance-sheet." Among the chief causes of non-success may be included the following: The selection of an unsuitable breed, of a strain in which the birds have never been bred for laying; birds that are too old or that have been hatched too late; overfeeding or feeding on an unsuitable diet; overcrowding in the run; tainted ground; diseased birds being allowed to enter the yard, and thus affecting the other inmates; or careless management during a late moult. Given a suitable breed, the hens being hatched at the right time, and neither kept too long nor allowed to become fat, with suitable housing and feeding, there should be no difficulty in keeping up a good supply of eggs; indeed, we are of opinion that it is the small poultry-keepers, who will, in a large measure, solve the problem of the "winter egg," since their birds, being few in number, can have the individual attention impossible in a large establishment, and being kept in covered runs, well sheltered from wind and rain, they will be likely to produce an ample supply in the cold months when eggs are at a premium.

**Selecting a Breed.**—It is a great mistake to suppose that poultry will not flourish in confinement, the great point being the selection of a suitable breed. In the majority of cases one of the heavier breeds should be chosen, as they are *for the most part* more inclined to winter laying than the Mediterranean breeds, and winter eggs should be *the* consideration in view. On the other hand, if the run is very small, such fowls are apt to get fat and lazy unless very carefully watched and fed, and any of the light active breeds, such as the Leghorn or Campine, would be better. Many strains of Leghorns and some of Minorcas are capital winter layers, and will give excellent results, whilst they have the distinct advantage over the heavier breeds of not going broody, and consequently wasting much valuable time, from an egg-producing point of view.

Among the recognized winter layers suitable for confinement we can confidently recommend the Buff or Barred Rock, the Coucou de Malines, the Sussex, and the Croad Langshan.

**Making a Beginning.**—When stocking the yard, two alternatives are open to the beginner: either eggs can be purchased from a reliable breeder in the spring, and the chickens reared ready for the autumn; or good stock pullets can be bought in September or October ready to start laying by the beginning of November. Where space is very limited the second method is to be preferred, as a good deal of experience is necessary to rear chickens successfully in a limited space, and this the amateur will hardly possess. The second method is easier, as it is much simpler to successfully look after matured birds, even in the winter months, than to try rearing. Where chicks are to be reared, every available bit of ground must be given up to them, and great care exercised as regards cleanliness. Purchased fowls should be bought on the deposit system, and when they arrive they should be carefully examined, noting the eyes and mouth for any signs of discharge or bad odour, the colour of the comb, and condition of the droppings, whether white or greenish, etc. It is a wise precaution, before introducing fowls to others already in the run, to give a week of quarantine to the new-comers.

**Renewal of Stock.**—The "backyarder" is, in the majority of cases, wise to confine his attention merely to the production of eggs for consumption. Breeding stock kept in small confined pens is rarely successful, and where eggs for table purposes only are required there is, of course, no necessity to keep a male bird. In towns this is specially needful, as neighbours are so apt to complain of the crowing of cocks. It is best to keep only pullets or one-year-old hens, and to renew the stock by purchasing pullets every autumn. Where forcing for eggs is carried on, this yearly renewal is essential, as hens that have been forced during their first season are rarely such good layers during their second year, and certainly not after that period.

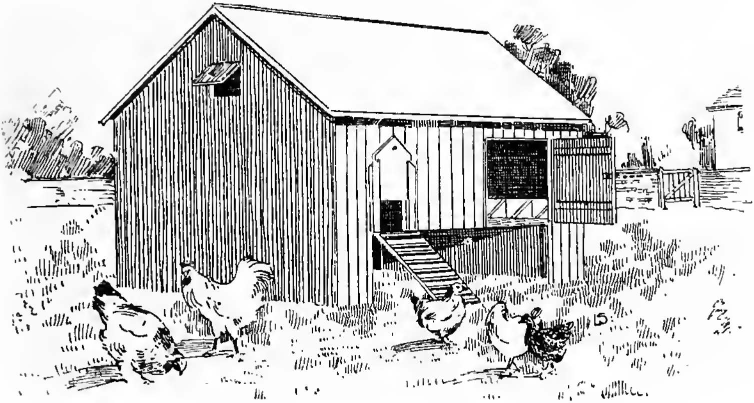
FIG. 28.—THE "SENSIBLE" POULTRY HOUSE.
(New Poultry Syndicate.)

Suppose pullets are bought in September; if they are March-hatched they should be laying by the end of October, and should continue right through the winter with good management, and during the spring and early summer with brief intervals. They will moult earlier than birds on free range, so should be fattened up a little and sold in the beginning of July, before this takes place, at 2s. or 2s. 3d. as live birds, there being a good demand in Jewish quarters for fat live birds. Of course this is a good deal less than they will have been bought for, but the profit comes in with the large number of eggs laid, and as the food bill is low when only a few hens are kept this profit should be a good one. Most "backyarders" will find the policy of forcing for egg production a wise one, and with the judicious use of ovary tonics the birds should yield a large number of eggs. If the birds are kept through their first summer they should be made to moult early, and to lay a good number of eggs up to Christmas, when they should be induced to go broody and may be sold to exhibitors who need them for rearing early sittings, and who will pay 3s. to 4s. 6d. for a good well-feathered hen at that time. No "old age pensioners" should be maintained.

**Kind of Eggs to Market.**—When the home table alone is supplied, it does not matter if the eggs are white-shelled, or they can be harmlessly tinted by putting them in the coffee-pot for a few minutes. Where outside customers are to be supplied, however, it is generally found that the brown-shelled eggs fetch the best prices, especially in the winter, and the breed or cross-breed kept must be one that will comply with market requirements.

Eggs with pale yolks often cause complaints from customers, and the trouble can be remedied by the inclusion of more green food (especially steamed clover hay) and some meat in the diet, together with a little iron in the drinking water. When eggs are sold for table, care must be taken, too, that nothing gives them an objectionable flavour, as onions, rank cabbage, stagnant water, or much fish, are all apt to do.

**Number of Birds to Keep.**—No hard-and-fast rule can be laid down about this, as it all depends upon the size of the run, and whether it consists of grass or earth; but, as an example, six hens could be comfortably kept in a house 4 feet by 6 feet, with a run 14 feet by 6 feet. With larger numbers in the run such proportionately good results would not be maintained, and, indeed, one of the commonest causes of failure among amateurs is overcrowding. Many people make half a dozen hens succeed very well,

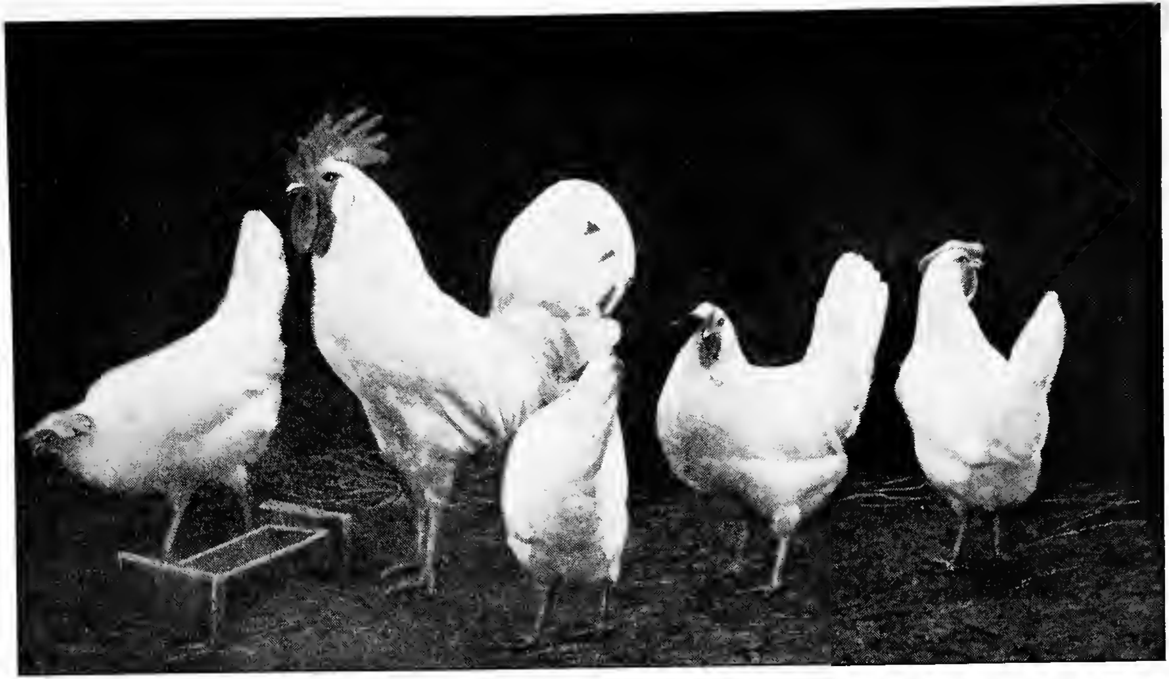

FIG. 29.—WHITE LEGHORNS: ONE OF THE BEST BREEDS FOR THE SUBURBAN POULTRY-KEEPER.
(Worcestershire Poultry Farm, Tardebigge, near Bromsgrove.)

and immediately jump to the conclusion that the more fowls they keep the bigger will be their profits, and proceed to double the number of the fowls while leaving the runs the same size. If too many hens are kept the home supply of house scraps, on which a few can be maintained very cheaply, will be quite insufficient, and extra lots of food will have to be bought, which will bring up the cost very much.

**Housing.**—Very often the housing question is the rock over which the "backyarder" trips, entirely unsuitable erections being too often considered suitable for the unfortunate fowls. One has only to walk about some of the back streets and lanes of our towns and cities in order to get an excellent object-lesson in how *not* to keep poultry. Of course economy has to be considered, and also the utilization of existing walls and other erections It may be doubted whether it is as cheap to build one's own house as to buy it, even if the labour, being "spare time," is not counted, as timber of a suitable nature is so dear when it has to be purchased in small quantities. The large manufacturers, owing to the immense quantity of wood purchased and their great output, can turn out some really excellent houses at a price suitable for the most modest pocket, and in the majority of cases it will be cheaper to buy. Where the house is to be home-made, however, a good working plan should be sketched out beforehand, and the haphazard sort of erection which does duty for many a poultry house up and down the country strictly avoided. Large packing cases will not make a bad sort of house, as they are of a good thickness and cheap into the bargain. Where a south wall exists, the house should be put up against it, so that the front will face due south. If a south-west angle is present, the conditions are very good, as the house can be put up with its back to the west wall, and the run at right angles to it, so that the run faces south; and as the fowls will be in the run the greater part of the day, they will get every available ray of sunshine.

It is not well to build where, owing to cramped conditions, it is not possible to extend should increase of stock demand it. The run can probably be extended if necessary, but not so the roosting house, and this should therefore be always a little larger than may seem essential at the time.

The house should have proper means of ventilation provided, and should be of simple construction, having all internal fittings removable to facilitate cleansing. Houses and runs should be made in sections wherever possible, and put together by screws, not nails—tenants' fixtures. Warmth is necessary for winter layers, and all draughts must be excluded. The roof should, of course, be covered with tarred felt, and the outside of both house and run treated with a mixture of 1 gallon of creosote-oil (bought from gasworks very cheaply) in proportion to 3 pounds of pitch, and applied whilst hot. The inside of both house and run should be treated with limewash several times a year, an excellent mixture being 10 pounds of Buxton lime, 3 pounds of soft soap, 1 quart of paraffin-oil, mixed with 3 gallons of water. Where a cheap structure is desired, a lean-to erection will be found convenient, and in this case the roof of the roosting house should slope away from the run, and not into it. The edge of the roof ridge should be carried well over both house and run. A gutter for rain is essential, and this should be kept well cleaned out. Nest-boxes can be made out of orange-boxes bought from any greengrocer at about twopence each, and they are very handy, being already divided into partitions. They need frequent limewashing and plenty of clean hay, which should be frequently renewed, or the eggs may get a musty taste.

**The Covered Run.**—Most winter layers benefit by partial confinement during the inclement weather, and where the " backyarder " or the small suburban poultry-keeper is concerned it is absolutely necessary, both for the matter of egg production and of the health of the birds, that their run should be a *covered* one. An open run becomes a quagmire in the winter months, and from a sanitary point of view would leave much to be desired. If, however, the run is kept sweet and dry, with plenty of scratching litter, the birds will be perfectly fit and well. As far as possible the pen should face south or south-west, and the whole of the ground forming it ought to be raised a few inches above the level of the outside path, otherwise the rain and snow will find a way in. Matchboarding 12 or 14 inches high should be placed round the three open sides (the house forming the fourth) to further the same purpose, but for winter use it is really advisable to continue this right up to the roof except on the front, so that perfect shelter from snow and strong winds is afforded. If the slight additional expense can be afforded, wooden shutters might be fitted around the framework of netting, and made in sections, so that in the summer the shutters (which would only be screwed to the framework of the netting) could quite easily be taken to pieces and stowed away. In the summer months it would certainly be a great advantage to have the netting only, as so much insect life and extra sunshine would make their way through to the birds.

**Keeping the Run Sweet.**—One of the greatest enemies the backyard poultry-keeper has to face is uncleanness in either house or run, and strenuous measures have to be taken to avoid this. Droppings, of course, can be easily removed from the roosting house if a deep litter of peat moss is kept therein, and if the excreta from the dropping boards is removed daily and saved for garden use.

Where land is rather more abundant, the small poultry-keeper can adopt the two-plot system, growing cabbage, potatoes, or mustard, on the one half, while the fowls are on the other, and digging each half very thoroughly in turn. If the run is very small, it is yet possible to adopt the same method, permitting the fowls the run of the whole plot for some little time (with the precaution of sweeping up the droppings daily with a stiff brush), then dividing the run lengthwise with netting. The fowls will remain on the one half whilst the other is roughly forked over, sown with cabbage and lettuce very thickly in the spring months, or with rye in the autumn, and left for a sufficient time for the seeds to come up well. The hens can then be turned into the rye or cabbage patch, as the case may be, and their late quarters treated in the same manner.

A gravel run is advised where the space is very cramped indeed, and where it would be even impossible to keep an earth run in a sanitary condition. The surface of the earth should be dug out for about 9 inches, and filled up with sound clean gravel, then rolled till it is quite sound. By means of daily sweeping and removal of the droppings the run can be kept clean for a very long time, and when common sense shows that it is necessary that the gravel should be removed, it can be simply dug out, placed in the open air, and exposed to the action of the weather, which will clean it by the time that the second lot of gravel put in its place has in turn become soiled. A couple of loads should suffice for a small run for several years.

An ordinary earth run will, however, keep sweet for a long time if plenty of litter is provided and the whole kept dry ; but we recently saw an excellent plan advocated by a writer in the *Poultry World.* One part of the run is elevated about 6 inches above the other by filling up with soft soil from the other portion. The lower half is to be trodden down till it forms a hard floor, and on this part the greenstuff and bones, etc., are to be fed, and the soft food in troughs. On all the soft earth a thick layer of litter is spread, and the grain thrown among it. The fowls appear to enjoy the little change from the one half to the other, and the exercise they derive from jumping about. If a few inches of the lower division are dug away twice a year, and fresh earth put in and well beaten down, there should be no fear of tainted land. If for any reason the earth run has become tainted, the best thing to do is to move the fowls to other quarters, if this can be arranged, or to sell them off, and have the top 6 inches of soil entirely dug away, the ground treated with disinfectants, and new earth carted in from elsewhere.

**Drinking Fountain.**—This must always be kept perfectly clean and placed where the fowls cannot tip it over. If it stands on two bricks there is less likelihood of the fowls scratching dust and ashes into it.

**Grit.**—This must always be supplied, and should be kept in a shallow tin nailed up in the run.

**Dust-Bath.**—A deep box for dusting is desirable, otherwise the fowls will be always scratching the ashes over the run, making it constantly untidy. A fresh supply of ashes can be brought from the house every day, and the old ones removed. It is not a good plan to place eggshells among the ashes unless they are well broken up, or the vice of egg-eating may be started. If the bath is placed in the sunniest part of the run, the fowls will spend many half-hours revelling in it.

**Feeding.**—The feeding of fowls in confinement calls for special care and thought. The birds must always be kept active and working, yet they must have good feeding materials in order to do their work well. The great majority of hens are too fat, and hence their egg organs become out of order, and in extreme cases actually diseased. The great fault among amateurs lies in overfeeding, and though birds in confinement need three meals a day, they must never be allowed to become lazy, and must be induced to take ceaseless scratching exercise in their covered runs.

A laying hen requires 3½ to 4 ounces of food per diem, but not more, or she will proceed to put on fat and down will go the egg record.

**Green Food.**—Animal food is essential for birds in confinement, and a regular supply of green food is a vital necessity. If sunflowers are grown in the run, they will be found highly useful, not only for the shade they afford, but for their highly nutritious seeds, which are of special value during the moulting period. Cabbages, lettuces, and other green vegetables, can generally be obtained as surplus stock of any greengrocer; but if a spare corner of the run can be utilized, and they are sown rather thickly, a regular supply can always be maintained. A cabbage head hung upon a string in the run will afford exercise to the fowls, and swedes and turnips cut in half are much relished. If all green vegetables fail, steamed clover hay should be added to the morning mash.

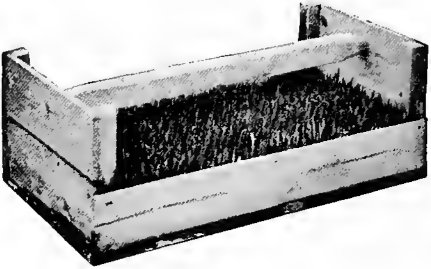

Fig. 30.—Sprouting Box for Oats.
(Randolph Meech.)

**How to prepare Sprouted Oats.**—One of the best and most economical methods of supplying fowls in confinement with the green food so necessary for their health and their success as egg producers consists in sprouting oats and feeding them in blocks. The system is extensively practised now in England, and has solved the question of the supply of green food in winter. It is certain that fowls in confinement lay many more eggs when given a regular quantity of green food than when they do not have it, and this is a very simple method of supplying it:

Wooden trays should be made, about 12 by 18 inches, and 6 inches deep, allowing for about ½ inch of the sprouted mass being fed to each hen per diem. The bottom of the trays is made of laths. Before nailing the laths into position it is well to give them a thorough soaking in water, so that they do not swell and bend when the wet mass of oats lies upon them. They should be nailed on to the trays sufficiently near to prevent the oats slipping through, but wide enough to allow the water to drain away. If the oats are to be grown in a very warm, dry place or outside, it is well to make a glazed sash, and lay this lid-fashion over the tray. Do not use too many oats at a time, a long succulent sprout being what is required, and as a general rule 3 pints of oats to each tray will be ample.

To start a tray, put 3 pints of dry oats on it, spreading them over the bottom, watering with warm water out of a sprinkler, and being very careful to allow plenty of water. Then spread an old food bag or thick piece of canvas doubled over the tray, first wetting it very thoroughly and tucking it down well around the corners; or, if preferred, when the sprouts are started, a piece of wire netting can be laid over the top of the tray, and the canvas laid on that, thus providing room for growth while keeping up warmth and moisture. This canvas must be kept very wet. The oats must be well watered twice or thrice a day, and under normal conditions should sprout in three days. Souring must be avoided, and as soon as the oats are about 1 inch high they must be carefully watched, and, if necessary, the water-supply lessened.

When the sprouts are about 2 inches high, take off the canvas, and put on the sash till they have grown high enough to touch it, when it can also be removed and water given more sparingly. When the sprouts are 4 inches high they should just be in good condition, and feeding can be started. A nice strip should be cut lengthwise from the tray without disturbing the remainder. If a second tray is started three days after the first, and a third three days after the second, a regular supply can be kept up for some time. When one or two lots have been sprouted, control of the moisture-supply will be understood, and the trays can then be stacked over one another and the water allowed to run through, but at first this should not be attempted.

**The Morning Mash.**—Biscuit-meal, barleymeal, sharps, and bran, may all be used as the foundation of the morning feed, together with all the house scraps available. Too much bread or too many potatoes should not be given, as they are likely to cause fat rather than the formation of muscle; but both may be used in moderation, together with scraps of lean meat, bits of pudding and vegetables, bacon rind, and all the other odds and ends of housekeeping remains. A stock-pot should be kept for the use of the fowls, and where every available bit is served up it is simply wonderful what can be saved in the way of food. If the stock-pot is kept going, the contents can simply be poured in with the scalded bran, and dried off with one or other of the meals used. The whole should be mixed to a crumbly, moist consistency, and never made too wet, or it forms a glutinous mass round the fowls' beaks which they do not appreciate at all. The mash should be given warm, but not hot, and poultry spice or mustard may be added thrice a week (the latter well stirred in and not given in lumps) in inclement weather. Small potatoes, for a change, can be boiled and added to barleymeal, and the two following menus have been proved very satisfactory by a " backyarder " who will, we trust, pardon our quoting them :

I.

| | | |
|---|---|---|
| Peameal .. .. .. | 1 part | Dried off with sharps. |
| Baked breadcrumbs .. .. | 2 parts | |
| Green bone .. .. .. | ½ ounce for each bird. | |

II.

| | | |
|---|---|---|
| Biscuit-meal .. .. .. | 2 parts | Dried off with barleymeal. |
| Bran .. .. .. | 1 part | |
| Boiled meat .. .. .. | 1 ounce for each bird. | |

Soft food should always be given in troughs in a small run, or it may get contaminated with droppings. Only give as much as the bird will clear up at a time, as sour food causes diarrhœa.

**The Midday Meal.**—In the majority of cases it is better to give a moderate quantity of food for breakfast, so that the birds will not stand about lazily in the cold. If half-rations are given first thing in the morning, grain should be buried in the scratching shed, but not too thickly, or they will find it too easily without obtaining the needful exercise; nor too thinly, or they will give it up as a bad job. This will keep them active and employed all the morning, and at midday they may be given a handful of oats in winter, or split peas in summer, together with 2 ounces each of fresh cut green bone or boiled meat (lights, liver, or paunch), and the day's rations of green stuff—cabbage, sprouted oats, Brussels-sprouts, etc.

**The Evening Feed.**—This is the last meal of the day, and should be of a substantial order, that the birds may go to rest with full crops. Oats are about the best grain to use, alternating regularly with wheat. Barley and maize are allowable in cold weather, as they are both heating, but both should be given cautiously to birds in confined runs. In cold weather boiled corn is much relished, or as a titbit "scorched corn," prepared by filling a shovel with corn and holding it over the fire till it scorches, but does not burn. It is surprising how a few little changes of this kind will benefit the birds, who like variety nearly as much as human beings.

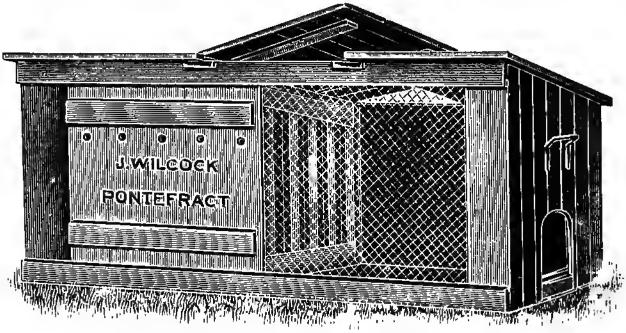

FIG. 31.—COOP AND RUN.
(J. Wilcock.)

**Cost of Feeding.**—Where more than three or four hens are kept, food should be bought in as large quantities as possible, if it can be stored in a dry place, as a considerable amount can be saved by this means. If every advantage is taken of the house scraps and any extra ones which can be obtained, the cost of feeding should never exceed 1½d. per hen per week, and with very careful management it can be brought down to 1d. This brings the cost of each hen's maintenance to 4s. 4d. a year in the latter case, which represents a certain amount of management and economy. At 1½d. per head per week the year's cost of keep for one hen would be 6s. 6d., and the number of eggs she would have to lay in order to make a good profit would have to be increased.

**Profit of Domestic Poultry-Keeping.**—It is extremely difficult to give hard-and-fast statements in cases like this, where so much depends upon the selection of the stock, their management, the cost of their food, and the price at which their eggs are sold.

Even a good ordinary hen ought to lay 120 eggs a year, which, if put at 1d. each, would bring in 10s. per annum. That is a low estimate for a town where new-laid eggs fetch 2½d. and 3d. each in the winter months, and seldom go above fifteen for 1s. in the summer; so that even if the cost of food be reckoned at 1½d. a week, each laying hen would be earning about 3s. a year, and if food were reckoned at 1d. the profit would be about 5s. If good stock is owned, the *average* should be over 150, which would make a vast difference to the profit-earning capabilities of the flock; whilst the 200-egg hen is a possibility even in the backyard. Of course, depreciation of stock has to be allowed for, but with skilful management this can be reduced to a very small amount, whilst there is the value of the manure to be reckoned in, and there will be " side-lines " in addition.

It will be readily understood that in such an estimate as the above, where a small flock of hens is kept for home purposes, and tended in spare time, no allowance has been made for labour and establishment charges.

**Keeping an Account.**—This is highly necessary, but need only be done in a simple manner. In an ordinary penny notebook one side can be kept for receipts and the other for expenditure, and both should be ruled off into months and days, when the regular entering up will prove a very short matter.

Among the expenses will have to be entered the cost of stock, foods, and appliances, carriage, stamps, any advertising, hampers, and "sundries." Receipts will include the sale of eggs and fowls (all those used in the home being reckoned at market prices), sale of surplus stock, day-old chickens, or charges for hatching eggs for fellow-poultry-keepers. At the end of each month a little balance-sheet should be drawn up, so that it can be seen which department is paying best, and what are the most profitable months of the year.

**Egg Records.**—Every small poultry-keeper should know the exact laying capacity of the fowls in his run, and whenever possible trap-nests (one to every three birds or so) should be introduced, and egg records kept. If trap-nests are not used, the small number of birds kept should enable their owner to identify the egg laid by each one, and a record should be kept for each bird, so that all below a certain standard can be thrown out of the flock.

**Preserving Eggs.**—Where prices for eggs in the summer rule very low, the eggs laid in the home pens should be preserved in water-glass, using only fresh ones with normal shells for that purpose. They can then be used for home consumption in the winter months, allowing the new-laid ones to be sold to outside customers. The preserved eggs will also find a ready sale at a penny each, but they must not, of course, be sold as "new-laid."

**Chicken-Raising.**—Many a small poultry-keeper, who by reason of limited ground could not hope to rear chickens successfully for *stock*, can nevertheless realize a nice little profit by rearing table chickens for the fatteners, either finishing them off at home or sending them off in a rough state at fourteen or sixteen weeks old.

Methods of feeding and rearing which would be quite unsuitable in the case of future stock birds are quite all right for birds which have such a short span of life. If the run is divided up into a number of small pens, the manure being regularly removed and the floors kept covered with ashes and scratching litter, quite a number of chickens can be reared in a small space with success. Only quickly-maturing breeds or cross-breeds should be chosen, and the eggs or day-old chicks ought to come from a farm with free range for its stock birds, so that the birds start life with a sound constitution. The pens ought to be divided up so that birds of different ages can be kept and a regular succession of "rough" chickens can then be sent up to the finishers of Surrey or Sussex, who will give good prices the whole year round for lean chickens of large frame.

**Rearing Table Ducklings.**—In the same way day-old ducklings or a setting of duck eggs may form a very considerable source of profit, as they are such hardy birds and will stand very small quarters with no injury to health, and they fatten so rapidly that they may be turned into money at ten weeks old. If the right time of the year is chosen, and the ducklings are well fed and ready for killing in April or May, the top prices of 6s. to 8s. a couple may be obtained—not bad for a backyarder. In any case, if a succession are reared they will provide a good dinner now and then for the home table, and there will be a ready sale for them in the neighbourhood.

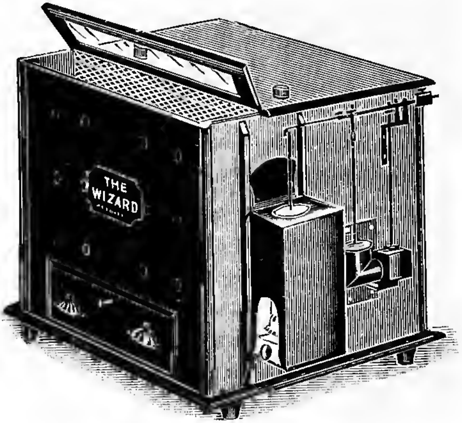

FIG. 32.—HOT-WATER INCUBATOR.
(New Poultry Syndicate.)

**Day-Old Chicks.**—That there is money in the day-old chick or day-old duckling business is easily shown, and among the most successful in this line of business have been small poultry-keepers. We know of two ladies who started with a couple of second-hand incubators, and a

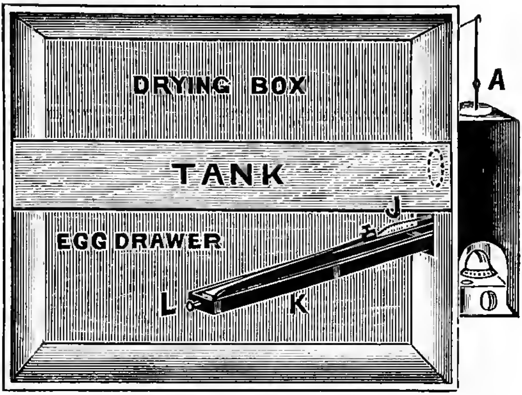

FIG. 33.—PATENT REGULATOR ATTACHED TO A HOT-WATER TANK INCUBATOR.

(New Poultry Syndicate.)

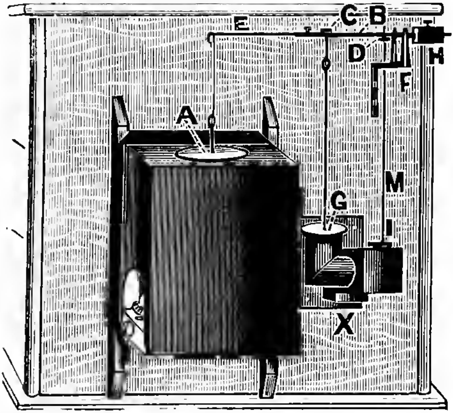

FIG. 34.—SECTION OF HOT-WATER INCUBATOR, SHOWING PATENT REGULATOR AND VENTILATOR COMBINED.

(New Poultry Syndicate.)

supply of eggs for hatching from the yard of a farmer friend, and who, by diligent attention to business, skilful advertising, and a determination to send out nothing but the right stuff, have so increased their field of operation that they are this year the possessors of fourteen large incubators, and an order list nearly as long as the incubator-room from satisfied customers of previous years.

The backyarder's own birds will not, of course, be able to supply the necessary eggs, and these should be obtained from other sources, preferably from farms where the stock birds have free range. A contract price is usually arranged when a quantity is taken, the "day-old chick" season lasting from January to the end of May, unless chicks are specially ordered or wanted for the table trade. Popular breeds or cross-breds should be selected, and it is a wise precaution, when settling terms with the farmer, to arrange that not more than one variety should be kept on the place, unless there are special facilities for separation, in order to minimize the danger of miscellaneous eggs being supplied.

It is, of course, little use to embark on this side-line without a good incubator-room, a half-cellar being excellent for the purpose; and where second-hand machines are bought, they should be of a reliable make and well examined for condition before purchase is made. The general directions for hatching by incubator should be studied, and the chicks when dry despatched immediately in the suitable boxes made for the purpose by all appliance-makers, labelled carefully, and despatched by passenger train. If they are being sent to towns, the railway companies will in most cases deliver them very quickly; but where the chicks are to be sent to remote districts the purchaser should always be advised, so that the box can be fetched at once.

Every effort should be made to fulfil orders promptly and in rotation, and orders only taken for as many as can be guaranteed to the date promised. In many cases where too many orders are received the customers are kept waiting weeks and weeks, and where this occurs repeat orders are not likely. Where a certain breed is ordered it must be sent; any "mistake" here spells future failure. At the same time, the novice purchaser must not hastily assume that a dealer in day-old chicks is a fraud simply because, when they arrive, they do not conform to his idea of the breed. Croad Langshans, for example, when young often show a good deal of white; in fact, the best adult specimens almost always do, those which are all black when hatched rarely making good birds. It would therefore be very unfair to blame the dealer for what was, after all, a natural colouring effect. It is quite safe to say that for some years at least the demand for day-old chicks and ducklings will be far ahead of the supply, and in the latter case, particularly, there is much room for development. There is so much more satisfaction for the purchaser in obtaining live chickens than in the case of a sitting of eggs, which may or may not hatch, that it is reasonable to suppose that many people will continue to avoid the trouble of managing broody hens or incubators, and obtain from others the finished product. A clear understanding as to deaths on rail must always be arrived at with purchasers, and instructions to the effect should be nailed on the outside of the box.

Any chicks which seem chilled on arrival (which rarely happens unless the journey has been very prolonged, as a dozen chickens, the number usually despatched, will keep each other nicely warm) should be put in front of the fire before being put under the hen or in the brooder, feeding them with biscuit-meal soaked in warm milk and squeezed dry.

If a lining of hay is tucked inside the chicken box, and a piece of flannel loosely fastened over the top of the chicks, they should travel quite comfortably even over long distances.

# CHAPTER VII

# POULTRY-FARMING

Definition — Qualification and training — Capital — Choice of land — Plant—Food bills—Stocking—Branches—Accounts and profits—Women poultry farmers—The daily round.

**Definition of the Term.**—An unfortunate stigma has long attached itself to the word "poultry-farming," arising mainly from the ridicule passed upon an exploded fallacy, which maintained that poultry-farming could be profitably carried on quite apart from all other branches of agriculture. Many people went to the length of refusing the title of "poultry farm" to any holding which maintained other stock or practised the cultivation of crops, even though the products went in both cases for the upkeep of the feathered stock. Such misconstruction of a right and proper term deserved its fate, and practical experience has shown that, where poultry-keeping is practised on an extensive scale, it can only be *economically* conducted when supplemented by simultaneous agricultural operations, which can and should be made to work successfully and profitably along with the main business of the farm.

The unit dealt with in poultry-keeping is so small that profits are bound to be low unless the acreage is sufficiently increased for the accommodation of the required head of stock, and this, by necessitating the operations of agriculture, at once upsets the theory that poultry can stand alone, pay all expenses, and provide a large margin of profit.

Between the extremist on the one hand who draws ideal pictures of country life and of poultry-keeping as a short-cut to immense fortune, and the extremist on the other who regards the business as the last refuge of the feeble-minded unable to take up any other career, it appears at first sight difficult to obtain a just view of the question.

As is usually the case, both parties are simultaneously right and wrong. There *is* money to be made out of poultry-farming, and there are numbers of men and women who are making a good income from the occupation, whilst here and there one comes across instances of wonderful success.

On the other hand, there have been many failures of those who have wished to go " back to the land," and these are probably responsible for the unduly pessimistic attitude adopted in some quarters.

Generally speaking, the successful men have been those who have possessed both skill and experience, or who were fortunate in being able to cater for or open up a particular market ; and where failure has occurred, it has been in the majority of cases due to errors of management and an insufficient appreciation of the difficulties of the enterprise.

It must be clearly understood that the average hen is not capable of providing a wide margin for profit the while she is fully debited with the rent and the food and labour bill. Certainly she should be able to pay for her keep and expenses, and leave that small profit which amounts in the aggregate to the yearly income of the poultry farmer ; but in order to secure that narrow margin it is necessary for the farmer to be well up in the details of an intricate business, and to have the necessary training and qualifications, as well as a genuine love for the work.

**Some Aspects of the Question.**—It is a mistake to imagine the poultry farmer's life an easy one and one in which any person whatever can make a brilliant success. Much of the detail work is hard and unremitting. Weather conditions will often make the daily round distracting to a degree, and, whatever the climatic conditions, there must be no intermission or postponement of duties. Fowls are not inevitably healthy, or chickens always easy to rear, and Sundays and holidays are as full as weekdays of the routine work of the farms. Stock must be fed, eggs collected, chickens watched, broodies visited, lamps filled and trimmed, and the rest of the thousand and one details of a poultry farmer's life attended to. Lazy, lie-abed methods will not answer with poultry, and the man who expects to make money without working for it will be grievously disappointed if he hopes that this occupation will answer his purpose. Not that we wish to act as the proverbial wet-blanket; on the contrary, we are of the opinion that the life is one of the most interesting and absorbing it is possible to find. The mysteries of breeding and incubation, and the processes of growth and development of young life, are always fresh and full of fascination, and there is ample room, on the utility as well as on the exhibition side, for personal research and investigation. There is, moreover, such an awakened interest in the industry, and so much improvement in methods of working, that (taking into account the unfailing demand for flesh and eggs) the possibilities for the poultry-keeper appear to be almost unbounded at the present time.

**Personal Qualifications.**—It would be distinctly unwise for anyone to give up a settled occupation on the strength of a desire to take up poultry-farming, unless he were certain that he possessed the necessary qualifications. The prospective poultry farmer must know both practically and theoretically the ins and outs of a somewhat intricate business, made up of a mass of small details; he must have patience, common sense, and perseverance, and the knack of making opportunities. The man who would risk the whole of a little capital in establishing a farm, knowing little or nothing of the science of its management, and having no income with which to support himself during the building up of the business, would only have himself to blame for failure, since in no other trade or profession would such a piece of egregious folly be dreamt of. The income which may be derived from a going concern depends for the most part on the character of the man who has built it up, and in the matter of poultry-farming luck can hardly be reckoned as a factor in his success or failure. He is not at the mercy of the weather like the general farmer, much though it may affect him; and whilst the work is not to be regarded as a short-cut to fortune, it is yet one of the few outdoor occupations at which a fair income can be made. If the work be not thoroughly congenial, it is a mistake to embark on it; and a keen business instinct is a necessity in these days of stern competition.

**Training.**—Both theoretical and practical knowledge are essential, and the more of the latter the better. No amount of second-hand knowledge picked up from books will suffice; there must be sound practical knowledge, only to be attained by active work on a poultry farm. Most of the large establishments of the kind in England receive pupils for a small cost, in some cases the premium being lowered if the pupil will place his services at the disposal of the farmer, as his labour, though unskilled, is of some value. On such a farm the details of artificial incubation and rearing, the suitability and practical value of foodstuffs, the care and control of stock in health and the management of them in sickness, together with the marketing of produce and the dovetailing of the various branches of the work into a profitable whole, can all be learnt; whilst a knowledge of the most up-to-date methods and appliances, and of the general routine of work, can be studied in a manner impossible to the theoretical student. Some institutions, like the County Council agricultural colleges, exist solely for the instruction of pupils, and much can be learnt on these farms which would not be possible on a working concern, and *vice versa*. The best plan is for the intending farmer (if the extra expense can be afforded) to take the two kinds of training, so that every possible opportunity of obtaining new ideas can be grasped, and a balanced judgment formed as to where the best openings and most suitable fields for new enterprises lie.

As an illustration of the wide range of ground covered, we quote the outlines of the syllabus issued by the Lancashire County Council Poultry School, where practical training is carried on side by side with the theoretical work.

**Details of Syllabus.**—"Poultry-keeping in connection with a house, farm, or cottage; breeds; selection for egg and table produce; natural and artificial incubation and rearing; suitable diets for young chickens, growing stock, laying hens, fattening fowls; economy in foods; utilization of farm products; housing; yard-planning; marketing of eggs and fowls; egg preservation; fattening of fowls, turkeys, and ducks; prevention, diagnosis, and cure of disease; suitable soil for poultry-farming; utilization of by-products; general management of a poultry farm; purchasing foods, appliances, and stock; necessary expenditure; plucking, trussing, and dressing fowls; management of poultry in connection with a dairy farm," etc.

As to the length of time spent in training, that is a matter depending very much on what the previous experience has been, and upon the quickness of the individual, but we consider that two years would be a sufficient time in the majority of cases, though three would be even better.

**Utility or Exhibition.**—The question as to the branch of work to be adopted must be settled in good time, and the training regulated accordingly. It is usually considered that the exhibition man has the better chance, because he is able to sell his picked specimens at such good prices; but it must not be forgotten that it takes time, skill, and at the present day the expenditure of a good deal of money, to make a name in the "fancy," with competition growing keener every year. The expenses of a big establishment are very heavy, and a much larger capital is necessary to cover a longer period of waiting for profits. In the case of a utility farm the profits come in more quickly, though such high prices are not obtainable in stock and eggs.

Farms purely for table eggs and flesh are few in number in this country, as the general farmer, having more advantages in this respect, is principally concerned in such enterprises. Nearly all the best utility poultry farmers combine the advantages of stock and utility birds by aiming, not at show standards exactly, but by breeding true to type birds which are yet excellent layers or table fowls. This is very profitable when practically worked, as there is a good demand at high prices for birds possessing good economic qualities, and which are at the same time true to type and breed.

The wisest plan in active working is to combine several branches of the industry, economy, and in consequence increased profit, being attained by a judicious dovetailing. Undoubtedly, those who have been most successful in utility poultry-farming have been those who have looked ahead, and created a demand rather than waited for it. Of late years the demand for pedigree utility stock has been far ahead of the supply, and trap-nested layers and their progeny fetch excellent prices; whilst eggs for incubation, or day-old chicks from tested laying strains, the rearing of table chickens of undoubted quality, or the raising of young stock for the fatters of Sussex and Surrey, are profitable sources of revenue. Whatever line is to be adopted, that one should receive special attention during the preliminary years of training, and the less congenial branches should as far as possible be avoided, as they are not likely to pay as well as those into which the whole interest can be thrown.

**Amount of Capital required.**—This is an extremely difficult matter to settle definitely, so much depending upon circumstances and personal qualification. One thing is certain: that in taking up poultry-farming as *a means of livelihood*, and not as an adjunct to another business, there must be a sufficient capital to live upon for the first eighteen months, till profits begin to come in. The first year or two is always the difficult time to tide over, and expenses seem endless and incomings a minus quantity. So many poultry farms have been crippled simply because the owner has sunk all his money in the venture, and tried to take his living out of it from the very first, a procedure which amounts to living on capital. The whole affair should be regarded as buying the goodwill of a business, and be religiously looked upon in that light. If money—capital—is being constantly withdrawn during this preliminary building-up period, the affair is crippled at its very outset. It is difficult to *over-estimate* expenditure, and with even the most

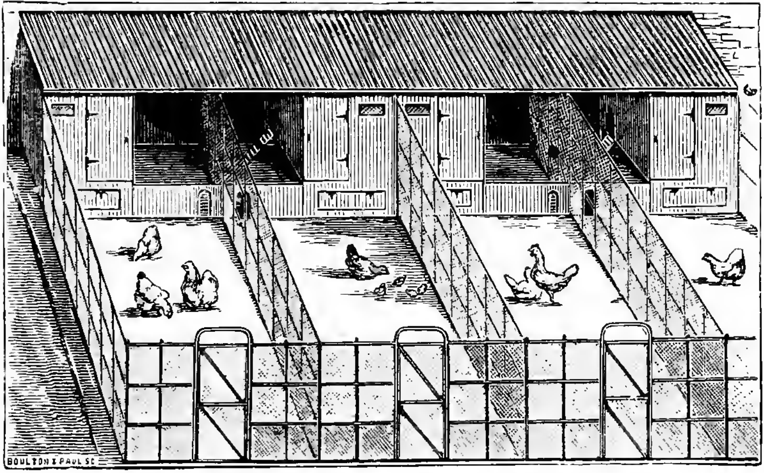

Fig. 35.—Range of Poultry Yards.
(Boulton and Paul.)

rigid economy—the purchase of many appliances second-hand, the reduction of outside labour to as low a figure as possible, and the construction of many articles at home —£100 will not go far in the equipment and stocking of the farm, and another £100 will have to be added to this for living and working expenses during each of the first two years. We should therefore put £300 as the lowest figure on which to start, and would prefer personally that the intending poultry farmer should possess £400. When one considers the host of small items which are needed for the plant alone—houses, sheds, runs, netting, stakes, food-bins, agricultural implements, barrows, bone-cutters, tools, egg-boxes, incubators, etc.—it will be seen that the latter estimate is not any too high.

It would be a suicidal policy, again, to purchase cheap stock simply because it was cheap, and to economize on that side of the business at the expense of valuable qualities. One so frequently sees articles in which the prospective poultry farmer is airily told to purchase 100 or 200 pullets of " good laying strain " at 2s. or 2s. 6d. per head, from which during the *first year* he will reap a golden harvest. That there may be such bargains we are ready to admit, but personally we have not come across them, our experience being that a man who has spent years of work on building up a strain of pedigree layers is not going to part with the flower of his flock at such low figures. That it is possible to purchase flocks of pullets at such a low figure we grant, but there is absolutely no guarantee that they will all be even moderately good layers. Successful egg-farming depends upon a stud of birds *bred for laying*, and these cannot be purchased right off—at all events, not at commercial prices—though the stock birds capable of producing them may be. Good stock cocks for the breeding pens cost money, and there are the expenses of their keep out of the breeding season.

In addition to the expenses of plant and stock, there are numerous " odds and ends " of expenditure which have to be considered in addition to the upkeep of the farm during the difficult first year. There must be money in hand to meet occasional emergencies, losses from disease or vermin ; and where market produce is sold in large quantities the purchasers may require three months' credit, thus adding to the risk of bad debts. The great thing is to have "a little over," so that no opportunities are lost, and every chance is taken advantage of without the harassing fear of running beyond the limit of one's income.

**The Happy Mean.**—Over-expenditure is just as harmful as under-estimation, and while the farm must be planned and arranged with up-to-date appliances (bearing in mind the stern competition which the poultry farmer of to-day has to face), it is a mistake to commence on too large a scale. The intending poultry farmer has to make his market, working in his supply by degrees, and getting a good reputation among dealers and merchants. It is a very common error to imagine that top prices and instant sales are waiting for every beginner. They are both to be obtained, but not until a good sound name has been made for having decent stuff and selling it honestly. The man who begins with a couple of pens of good birds, capable of breeding first-class layers, and who gradually increases his stock by means of his own birds, sending a few fowls and eggs to market, and making them pay as they go along, may do better than the one who launches out rashly into a big place, the management of which he does not understand, and where expenses of labour and upkeep reduce all profits. Many of our most successful poultry farmers have begun in a comparatively small way, gradually increasing their business out of profits, and finding satisfied customers (with repeat orders) the best advertisements it is possible to have. As the farm grows in size and

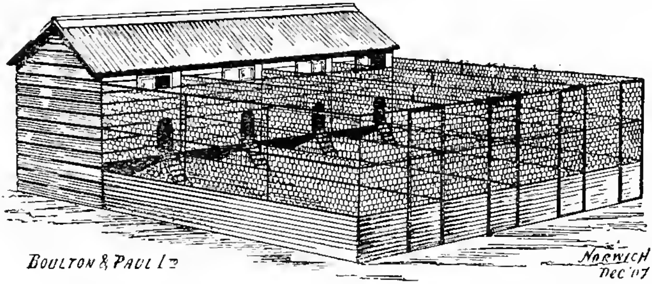

FIG. 36.—RANGE OF INDEPENDENT HOUSES AND RUNS TO ACCOMMODATE ABOUT TWENTY BIRDS IN EACH RUN.

the farmer in experience, different branches of work suitable to the locality can be opened out, and non-paying ones dropped or modified. Where a beginning has been made on too large a scale, it is often difficult to do this, and serious loss may be incurred.

**Choice of Land.**—At the same time it is always well, even where modest beginnings are made, to have one's eye on the future, and to extend operations in a thoroughly systematic manner. It is a mistake to start with too small a piece of land. Even if only a few pens, etc., are being run up for the present, the land must be there, or there will be trouble in the future. A model poultry farm must economize labour as much as possible, and this cannot be done if houses are erected all over the place, as is inevitable when a few acres are taken in from time to time. The whole scheme must be properly planned on paper beforehand, and sufficient acreage allowed for breeding and laying pens, rearing grounds, and emergency runs, making all possible use of existing buildings and natural shelter. Plenty of good grass land must be available for chicken-rearing, preferably near to the dwelling house, and large enough to divide into two parts, only using each in alternate years. The soil for a good farm should be well drained and fairly dry, though it is a mistake to regard sandy or gravelly soil as ideal. Such soils certainly are easier to keep sweet, but are deficient in natural food and insect life. High land is preferable to low-lying ground, but a portion should be protected by hills and trees from northerly winds. Arable land needs careful apportionment, and should be turned to the best account by judicious cropping.

Fowl-sick land must be strictly avoided, and a farm over which a large head of poultry has been running for some years (and which may have been very successful during that period) should be carefully inspected before renting or purchasing, nothing being more conducive to failure than tainted ground. Wet weather is the best time to inspect a prospective purchase, as one sees the land under its very worst conditions. Distance from good markets must be considered, also the distance from a good railway line, carriage often running away with the major part of the profits. What at first may seem to be an excellent holding may turn out to be the reverse by reason of transport difficulties, and a high rental may be counterbalanced by advantages of marketing. Rent of land varies very widely, and it is impossible to give hard-and-fast prices. From 10s. to £2 an acre may be regarded as existing figures ; but the poultry farmer can often make arrangements with the general farmers of the district whereby his birds can be "boarded out" for a small consideration, the value of the manure deposited being taken into account when payment is being arranged.

The suitability of the holding must be considered also in relation to the other branches of the farm, since successful poultry-farming involves husbandry as well. If these other branches are able to stand a heavy rent for rich land, it may be wise policy to secure it, bearing in mind that the fowls will thrive proportionately better on good than on poor soil. To a certain extent the choice of breeds must depend on the nature of the land, though there are few districts in which some breeds are not suitable.

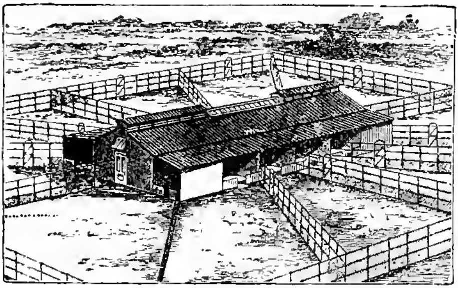

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FIG. 37.—A MODEL POULTRY PLANT.
(Boulton and Paul.)

**Local Considerations.**—If there is no limitation to any particular county or district, the poultry farmer can pick his own lines of work, and settle in a part where that particular branch has been found successful—as, for example, the south-eastern counties for the production of table fowls ; the Aylesbury, Bucks, and Beds districts for "ducking"; Norfolk for turkeys ; the neighbourhood of a coast town or large manufacturing city for a mixed trade in eggs and table fowls, or of an egg-collecting depot for the egg farmer pure and simple.

Where there is no choice as to locality, and a certain district is imperative, the object in view must be to produce in accordance with the local requirements and custom of the place. If a number of people in a locality are all engaged in one kind of occupation, it is inevitable that the traffic should become organized to a certain extent, thus obtaining better facilities for transit and reduced rates, while as a natural consequence the cost of production is lessened, and the marketable value increased. This is specially important in a business like the one under consideration, where the margin of profit is never very wide. When the business is being run on more general lines, the locality is of less importance, provided it is near a good line of railway and not too far from a big town ; but where a special line or special lines are being taken up, very exact preliminary inquiries ought to be made before embarking on any scale, as it is fatally easy to get into a wrong district for such things. It is in the majority of cases wiser to generalize than to particularize, unless a market seems obviously open or a particular personal qualification is strongly marked, as the risks are more evenly distributed, though the profits may not be as striking.

There are many openings for the establishment of farms for table poultry and eggs only, though if in addition a few pens of pure-bred birds are kept for breeding purposes, their progeny can be sold at a higher figure than those killed for table. The production of eggs must be on a large scale, and the table birds turned out by hundreds rather than by dozens; whilst there must be a sufficient head of stock on the land to provide work for the whole year, and thus allow of a certain weekly income.

**Erecting the Plant.** — It is highly important that the poultry yards should be carefully planned out beforehand, and it is well for the prospective poultry farmer to visit well-known establishments, for the purpose of observing their methods of yard-planning. Failing this, the Utility Poultry Club, or the experts attached to the principal poultry papers, will afford valuable assistance for a nominal fee. The essential thing is the avoidance of unnecessary labour and the adoption of time-saving appliances.

Ranges of breeding or laying pens should be placed on each side of a central passage to economize time in the feeding rounds, and to enable any one pen to be reached at will without entering the others. If houses and runs are placed alongside, much timber and netting can be saved, and there need be no trouble with the male birds if the bottom of the party fence be formed of a width of galvanized iron. Netting for breeding pens should be run fairly high, so that there is no possibility of disappointment when eggs are sold for hatching purposes. By means of the central passage all the houses in the range can be fed and watered, and the dropping-boards scraped down most expeditiously; also eggs can be collected without fear of mixing. The houses themselves may be of the combined roosting house and scratching shed type for the sake of economy (and should be open-fronted, facing on their grass runs), double wherever possible, and having a wide door opening on to the passage, to facilitate cleaning and the provision of scratching and bedding litter, which can be brought down on a cart. The gates between each grass run should be of sufficient width to permit mowers and barrows to pass through. If the farm is of good grassland, it should be arranged that in April or May the contents of three or four breeding pens can be turned into one, till the hay is carried off the others, so that the important problem of keeping the land sweet will be made easier, and the value of the hay (which should be considerable, owing to the manure) will help to pay the rent. Where haymaking is not practicable, sheep should be kept to graze, and the grass may thus be kept short. Many poultry farmers find the fattening of sheep on their land a very profitable side-line. If the gates between the pens are of good width, it will make the securing of the hay crop much easier.

On a small farm of twenty or thirty acres, the best size for laying pens is about half an acre, on which forty or fifty birds may be run. Smaller enclosures mean too much expense in housing and fencing, while larger ones make control of the stock too difficult. On a small farm the question of cost is highly important, and the man who spends a shilling where sixpence would have done will not go far. All houses, scratching sheds, etc., should have similar locks, so that a big bunch of keys is not necessary, and uniformity of type of house is desirable for many reasons. Scratching sheds may be put to a double purpose, serving as shelters in the summer months for the growing stock, for which they are admirably suited, as they admit so much light and fresh air.

If the land is double-stocked for half the year, it can run 200 birds to the acre, and yet keep perfectly sweet, raising good crops of hay by means of the manure deposited. With flocks in confined runs more difficulties occur, as when the runs are very small the labour bill is too high, and, on the other hand, egg production falls off when the flocks are too large. This difficulty can be overcome by double stocking, allowing fifty birds to a quarter of an acre, and then removing to another sweet run. Double runs are all right if movable fencing or poultry hurdles can be erected on a part of one side, so that a cart can pass through to load the hay. If the entire stock could be shifted on to another half of the farm each year the plan would be ideal, but fencing usually makes this too troublesome. The mere value of the manure or of the extra crops is not the only question involved, the great thing being that the manure is *consumed*, so that the land is perpetually kept clean and sweet.

The rearing-ground should be near the dwelling house, so that a close eye can be kept on the young birds, and a dry, sheltered place is specially necessary where early chickens or *petit poussins* are to be reared. The coops and brooders should stand in long rows, for the purpose of economizing labour, and as much land as possible should be spared for this important work. At the age of ten weeks or so, when the two sexes are separated, they can be drafted off to the second piece of rearing-ground, and housed in small, easily-moved houses. If free range is to be given, much netting, etc., may be saved ; but it is usually best to divide them up into batches according to age and size, and use hurdles or roughly-erected fencing to keep them in runs till their fate is decided on. The laying flocks can either be run on the colony system (in which case movable houses must be used), or housed in lots of fifty in laying pens, or kept on the intensive system in big lots in a special intensive house. The incubator-room must be suitably arranged, well ventilated, and of equable temperature, and should contain a central packing-table, so that day-old chicks can be despatched in their boxes as soon as dry, obviating the risk of chills and waste of time which would occur had they to be transferred to another packing-room. The packing-boxes can be stored on shelves above the incubators if there is no fear of damp.

The food-room and store-room can be bought for a nominal sum in the shape of old railway-carriages, and one wonders why these very cheap yet durable " buildings " are not more frequently made use of. Good bins must be provided in the food-room, which should be as near to the fowls' quarters as possible, and to which water should be laid on. If the extra expense can be afforded, the provision of a water-supply to the whole farm will save endless trouble and worry, and natural sources of supply can often be diverted without much trouble. The bone-cutter should find a place in the food-room, together with a cooker and boiler for preparing the food and rendering down fat for table birds, etc.

A good fattening shed will be a necessity, and can also be used, if space is limited, as a packing-room for despatching sittings of eggs, though where a large number of eggs are sold for sitting, in addition to the ones sold for table purposes, a special egg-packing store will have to be provided, to hold the cases for despatch as well as the eggs themselves.

A series of small pens can serve as rearing enclosures for table chickens or for ducklings. For the latter a very limited ground area is all that is required.

Netting is often best put up on rough quartering, on to which it is lightly tacked by staples, so that it can be easily removed from one place to another. Houses for layers on free range, together with the cost of labour in erection, should not come to more than £2 10s. each ; those for laying pens, together with their fitting up, may run to £3 ; while breeding pens will not be put up much under £4. Incubators and rearers vary in price, of course, with the make and size, but it may be said that cheap stuff here will not pay. Small houses for young stock and cockerel boxes should not run to more than £1 ; while coops and sitting boxes will show a reduction if bought by the dozen.

**Food Bills.**—Where a large head of stock is kept, this item will be of necessity rather heavy, and for purposes of hookkeeping it is always well to have one quarter's food in hand. Birds on free range ought not to cost more than 1d. each per week all the year round ; but the breeders and layers will run up to 1½d. each, and even more, if economy is not considered. To rear a pullet to a laying age, exclusive of cost of labour, is generally estimated from 1s. 6d. to 1s. 9d., and a three weeks' fattening bill comes to about 5d. For half the year there will be the expense of the keep of the breeding pens and of the spare cocks ; and in spring-time, when the rearing season is on, the food bills will seem very heavy, unless other products, in the shape of day-old chicks or fatted chickens, can be turned into money. The practical man has not much to gain by constant fidgeting over weights and measures, a good working knowledge of values and the composition of the various foodstuffs being sufficient. It is, however, necessary to know suitable diets for laying, breeding, or fattening stock, economical methods of utilizing home stuffs, and the science of buying. All possible foodstuffs should be grown on the farm, but what must be bought should be bought in as large quantities as possible, and stored suitably.

A contract should be made with a local butcher for a regular supply of lean meat for the layers, and green bone, which can be chopped at home. A cheerful medium between the happy-go-lucky and the ultra-scientific methods should be struck. As an average, a hen requires 3½ ounces of food per diem all the year round, and her keep should never exceed 6s. 6d. per annum; more than this shows a wastage somewhere. Fancy foods must be avoided if the 1½d. per week limit is to be observed, and a bad purchase of corn may make a difference of several pounds in the month.

**Stocking the Farm.**—When commencing a utility poultry farm, it is essential to start with good stock bred from yards where the economic qualities of the birds have been the first consideration.

Suitable breeds of good strain and pedigree will cost more to begin with, but they will pay in the end. An autumn-entering tenant would do well to purchase a flock of hardy March-hatched pullets, for which not less than 4s. will have to be paid. In addition to this flock, from which he will have to select and discard according to their coming year's work as layers, there will be the breeding stock to select. This is a more serious matter, requiring careful selection, and must not be undertaken in a hurry, as there is more in selection of stock than anything else. The birds must be of good strain, but not too high in price, and only breeds which are the most likely to make profit must be considered. For the egg production of the first year the laying stock must be pullets, and, if economy has to be considered very much, it should be among the layers, not the breeding stock. Good healthy cross-breds reared on a farm will do very well for the first year's stock, which can be brought up to the required standard afterwards; and this will certainly reduce expense, though it is less possible to guarantee their qualities than when they are the offspring of tested layers. But the breeding stock should be the best for the purpose that is obtainable, and should consist of eight or ten birds, or ten to sixteen (according to breed) one-year hens brought through their moult in August, given free range for a month, and put in their permanent pens in November, ready for the December mating. The male bird for each pen should be a healthy, vigorous cockerel, bought from a reliable yard, and kept in good condition by judicious feeding. Runs of a quarter of an acre upwards are the most suitable for the breeding stock.

Table qualities have to be taken into account as well as egg production, and in the latter case size and colour of the shells have to be considered as well. Where flocks of pullets or hens are purchased *en bloc*, they should be approximately of the same age, to facilitate their treatment as a unit—as, for example, where it is desired to induce the moult.

Regarding the number of pens of breeding stock to commence with, this rests very much on whether a great feature is to be made of the day-old chick business and the sale of eggs for sitting ; but as so much depends upon the farm becoming known, and upon judicious advertising, it is safe to assume that the trade will not attain very large proportions for the first year or two. In the case where a beginning is to be made at once with day-old chicks, at least three 100-egg-sized incubators should be started, one after the other, in order to have a good supply of chicks, and to keep them filled not less than eighty hens mated up with eighteen or twenty cockerels would be needed, the breeds being popular ones. To make a pound a week profit from layers, quite 200 birds would be required, penned for convenience in lots of twenty, each lot having a good house and shed and an earth yard.

It should be emphasized that the stock-getters and laying birds should be treated separately, and, as far as possible, the departmental accounts kept apart. Many utility poultry-keepers are apt to consider their birds solely from the point of view of egg machines, and force their birds along by high feeding to obtain the highest possible number of eggs in autumn and winter, when prices are best. This plan is certainly advisable when profits are required, *but* such birds should not be expected to make good breeders in the spring. It is far better to make the most of a pullet's first year, and let her rest and moult before the strain of breeding begins, and to breed from the two-year-olds, using the pullets' eggs for commercial purposes. The age of hens must be regulated, old hens being rigorously weeded out, or the egg-supply will be lowered, and this means that the egg connection will suffer. Overcrowding in the case of stock birds must never be permitted, and where many poultry farmers, who have done excellently their first year, fail to maintain their rate of progress is by their increasing the head of poultry in the same runs, instead of increasing the space proportionately.

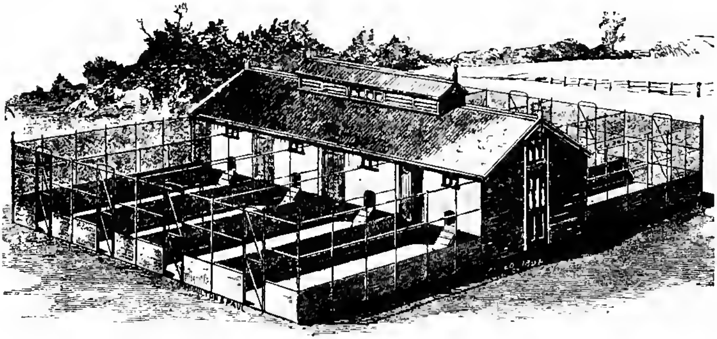

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Fig. 38.—Range of Houses, showing Double Runs. (Boulton and Paul.)

**Choice of Work.**—The poultry farmer will find it best to have definite ideas of the work he intends to take up, and to divide his flock into laying, fattening, and breeding stock, specializing as he pleases in one department or the other. There is an unlimited demand for new-laid eggs and good-class table poultry. Duck rearing or fattening offers a good opportunity for money-making, and trade in day-old chicks, especially those of good pedigree utility blood, is yearly increasing. Eggs for incubation from good-class utility birds will always command a good sale, if offered at low rates in the beginning, until a name be made. There is good money to be made from fattening birds, provided the business is understood, and also from the sale of rough chickens ready for the final polish, many of the fatters turning out 100 dozen birds per week during the busy months of the year. Pure-bred stock birds of pedigree utility parentage can be sold at a good price to improve other strains.

**Egg Production.**—Where egg production is the main object of the farm, operations must be systematized, and a regular supply of eggs obtained the whole year round to keep up contracts. The difficulty of obtaining them in the moulting season is overcome by frequently moving flocks from one quarter of the farm to another, so that the tendency to moult is kept back among a certain number of the fowls, others being encouraged to moult in the usual way, and by hatching in August as well as in the spring months, so that one flock fills in the gap left by the others. Broodiness must be strictly kept under, and a reasonable amount of forcing must be carried out in order to obtain the maximum profits. Much of the success of the balance-sheet will depend upon the contract prices obtained, and the bigger the contract, of course, the better the prices obtainable; but it is far wiser to take a slightly lower price, and deal with people and firms whose money is safe and reputation above suspicion, than to take risks.

It has been stated that, to make £100 a year out of egg production only—*i.e.*, using the surplus cockerels for the table—a stock of 500 layers should be kept regularly. To be a success, each hen should show a profit of 5s. a head per annum; and to do this it is necessary that the average of the flock should be high, for the difference between averages of 120 and 180 eggs per bird per annum means a difference of a good many pounds in the balance-sheet.

One hundred and fifty eggs may be regarded as a very good *average* for a flock, but this is not unattainable, provided the birds are carefully bred, penned, housed, and fed. If, however, owing to bad management, the egg yield only averages 100 or 120—with the bulk of these laid during the warm months—if hatching operations are wrongly timed, or if a bad contract is made, the poultry farmer has only his own mistakes to blame for his lack of success. There is no doubt whatever that, with proper management, eggs can be profitably produced all the year round.

The depreciation on pullets may be reckoned at about 1s. 3d. per head, and this must be taken into account when making up the balance-sheet ; but in very few cases is it advisable to keep old hens, as, though a saving in chicken-raising is certainly made when the whole flock is kept on for several years, the small number of eggs laid will hardly balance it, and few old hens will average 120 eggs per annum. Pullets lay more eggs, and lay them at the most paying season of the year, and as a rule moult about midsummer, when their place can be filled up by the August and September hatched birds. Assuming that 50 per cent. of all hatches turn out cockerels, double the quantity of eggs will have to be set to produce the requisite number of layers for the upkeep of the winter egg-supply and the maintenance of the home stock, the cockerels being sold or transferred to the fatting department.

**Table Poultry.**—There are several branches of the industry which are capable of much greater development. The production of " milk chickens," a field specially open to those who keep the lighter breeds of fowls, is likely to prove very profitable if the right class of bird is produced at the right time. As a separate branch of the work these little birds are hardly profitable, but as part of the whole working of the farm it is a profitable way of utilizing the young cockerels.

The increasing demand for good-class table poultry is far from being filled at the present date, and poultry farmers should specialize in this branch of the trade, and master the details of fattening. The reports of Mr. Edward Brown on the poultry industries of America and Belgium show that the production of " winter fowls " weighing from 8 to 10 pounds might be most profitably carried on in this country, as it has been over there ; also the breeding of ducklings for table, and of green goslings.

When the table side of the undertaking is subsidiary to egg production, it is not advisable to rear more chickens than are actually required to keep up the stock of pullets, unless there is a good local market. Where prices range from 2s. 6d. to 2s. 9d. for a young fowl, people require a large one, and to rear these, and cover the losses from deaths, etc., among layers, does not leave a large margin of profit. In many districts where the standard of prices is higher, quite a young cockerel can be sold for 3s. 3d. or 3s. 6d.

and in such a district it is worth the trouble of rearing extra chickens.

To obtain plenty of young cockerels to be killed off during spring and summer, a succession of eggs should be set right from December to April, and the cockerels killed at their most profitable age, which varies with the months. To rear 1,000 birds a year, not less than three incubators and six foster-mothers would have to be used, with some broody hens in addition. From private customers much better prices can often be obtained for table birds, and hotels or restaurants seeking a really good class of fowl, if once satisfied with their purchases, will make excellent customers. Eighteen-month-old birds should sell at 2s. 3d. each, and even an old bird, if properly marketed, at 1s. 9d. or 2s., according to weight.

In spring-time these outlets—for last year's late birds and the largest January chickens made ready for the spring trade—are found most valuable, since the rearing season is a very expensive one, and food bills have a habit of mounting up very heavily. A certain number of chickens must, of course, be reared, quite apart from the table side of the industry, for the re-stocking of the farm and the maintenance of the next winter's egg-supply, and these are the birds whose "board and lodging" account make the time an expensive one. A good trade in day-old chicks or sittings for incubation will help to bring in a little ready cash.

**Sale of Sittings.**—A good trade can be built up on the sale of sittings from the mated pens, but during the first year this should only be done on a small scale, as all the pullets will be needed for home purposes and for the filling in of gaps caused by the rigorous weeding out of "below-standard" layers, which will be going on. A common mistake is to charge too high a price for the sittings the first few years. The great thing is to get known and to give satisfaction, and a delighted customer is the best advertisement any poultry farmer can have. When a name has been made and a strain built up, the proud owner of pedigree utility stock will find that he can practically name his own prices both for sittings of eggs for incubation and for his stock birds ; but it is wiser to sell a good many sittings at a moderate price during the first year or so, and thus gradually make a name, than to charge too much and have only a small sale.

**Sale of Young Stock.**—As the advantage of possessing good-class utility birds becomes more widely understood, there will be a yearly increasing demand for pullets ready to lay, especially among farmers and busy men who have not the time to devote to rearing young birds ; and whilst this will necessitate the keeping of a very large head of stock, it is likely to prove very remunerative.

**Ducks for Eggs.**—For egg production alone the Indian Runner duck leads the way, flocks of selected layers often averaging 150 eggs per annum, and by seasonable hatching from January to May eggs may be had the whole year round. Ducks consume large quantities of food, and before investing in a large number (where eggs for edible purposes are to be sold) it is wise to inquire among the principal dairies and large shops to find out what prices they will pay all the year round. English duck eggs fetch more than fowls' eggs—generally a halfpenny each more—and if this price can be obtained it is well to start. On three or four acres of good grassland 400 layers could be kept, and a little space besides would answer for rearing. Ducks require much less room, and are far less likely to suffer from tainted ground, than fowls and chickens. Ducks whose eggs are merely required for edible purposes need not have swimming water provided, but where pens of breeding ducks are to be kept this is essential in order that the eggs may be properly fertilized. The demand for fertile eggs in the early months of the year is very large, and sittings fetch good prices. The Buff Orpington and Blue Orpington ducks have to a certain extent solved the difficulty of the very early egg, and where sittings are to be sold pens of these birds will be found very useful, especially as both these breeds combine excellent table qualities with high laying capacity.

As regards the production of ducklings for table, the general consensus of opinion among the large dealers is that they cannot get nearly enough ducklings of *really good quality* early in the season, the demand being always keen and the supply always short or inferior.

The rearing of table ducklings need not be separated from the production of duck eggs ; in fact, the two can go on side by side. It is remarkable that more poultry fanciers do not include this most profitable branch of work in their scheme, since ducklings are so easy to rear, require so little space, and are marketed at eight or ten weeks old, thus giving a quick cash return. Even on a small scale it can be very successfully carried out, thirty stock ducks of good strain keeping half a dozen incubators going during their laying season.

**Business Habits.**—If the poultry farm is to meet with any success, the whole concern, whatever the branches or sub-branches of the work undertaken, *must* be carried out with method and foresight, qualities more necessary than ever in these days of keen competition. Despite the often-quoted proverb, the poultry farmer *must* count his chickens before they are hatched, must have an eye perpetually on the future, regulating his affairs a year in advance, planning his yards, preparing his appliances, seeking fresh markets, and developing those already in existence, and now and again creating a new demand. All his contracts must be carried out to the letter, and every customer must be liberally treated and thoroughly satisfied.

Advertising plays a highly important part in the business world to-day, and the successful poultry farmer must be able to draw up enticing documents for the press, and must be prepared to expend a not inconsiderable portion of his capital in making himself known to the general public.

**Keeping Accounts.**—This is an absolutely essential part of the poultry farmer's business, yet how often a neglected one, albeit there is no industry in which detail plays a more important part than this one. Yet many people who are employed in poultry farming on quite a big scale are comparatively in ignorance of their actual financial position. They may be paying out wages and receiving sums of money for market transactions, but they are often entirely ignorant as to the profit, or lack of the same, in the different branches of their work; and whilst they may keep an account of their receipts, they may be totally in the dark as to the cost of production.

For examples of simple yet comprehensive bookkeeping we may refer the reader to the leaflet (No. 240) of the Board of Agriculture dealing with farm bookkeeping, or to the more specialized work of Mr. Tysilio Johnson, "The Utility Poultry Keeper's Record," which will be found most valuable.

If the different departments of the poultry farm are divided, and the account of each kept as clearly and distinctly as possible, it can be seen at a glance which are the profitable and which the non-paying divisions, and the lines of work can be regulated accordingly. The man who does not know what is the cost of rearing his pullets to laying age, of producing chickens or ducklings for market, the cost of the eggs produced each month, or the profits from his day-old chick business, is not likely to make his business pay. Any negligence in accounting for eggs laid, for the death of chickens, for addled or unfertile incubation eggs, for value of manure and feathers, expenses of marketing, postage, advertising, and carriage, is bound to affect the profit question.

An elaborate system is not necessary; indeed, one of the simplest may serve. If one page be given up to the receipts, and the other to the expenditure, each being ruled into thirty-one horizontal spaces, so that one month's work can be seen at a glance, the whole being again subdivided into the different departments of work, and diligently entered up each day, the profit or loss of each section for the month can be readily seen, though this plan is not so entirely successful as the separate entering up of the departmental accounts.

Trap-nested birds must have their own charts, though for safety's sake a duplicate entry might be made in the general account-book; and a stud-book, in which a brief description of all stock maintained and bought can be registered, is another necessity where breeding operations are carried on.

All produce used at home must be properly valued and credited. The day-old chicken trade, which is a slightly complicated affair, should have a separate trading account, and all particulars should be entered up in order that the after-fortunes of the stock can be accurately traced. Hatching records of all eggs set are desirable also. The balance-sheet is usually settled in December and June, and it is essential that a careful valuation of all live and dead stock be made when the books are opened, and again when they are closed, basing the valuation on what the stock would fetch at a compulsory sale, and including an annual 10 per cent. depreciation of all dead stock (houses, etc.), and allowing a 5 per cent. depreciation for accident, ill-

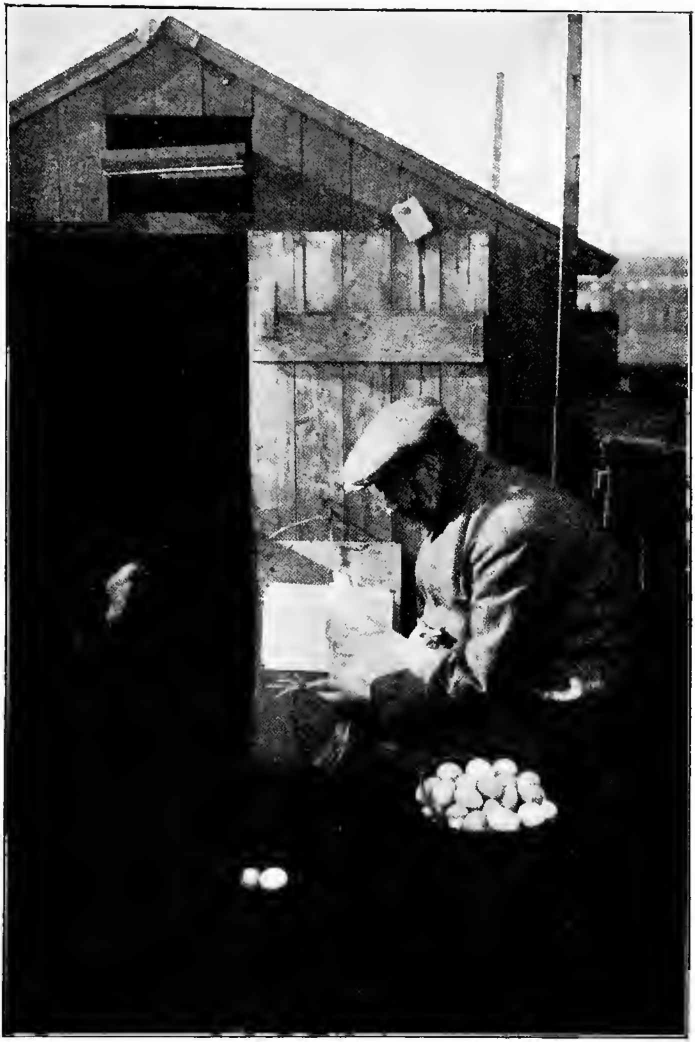

FIG. 39.—THE USE OF THE TRAP-NEST AND NUMBERED RING.
(P. T. Pyne, Ravenscar, Yorks.)

ness, and various expenses (including keep of male birds, etc.). Where poultry is not the sole stock kept, only a portion of labour and rent should be debited to them.

**Profitable Production.**—By means of these accounts the highly important question of the limits of profitable production can be ascertained, serving not merely to determine the prime and supplemental cost of production in relation to that of receipts, but, what is even more important, giving a clue to the causes of loss or success. Profitable poultry and egg production may be limited by a number of trading circumstances, varying in individual cases, but unnoticeable without the aid of accurate bookkeeping.

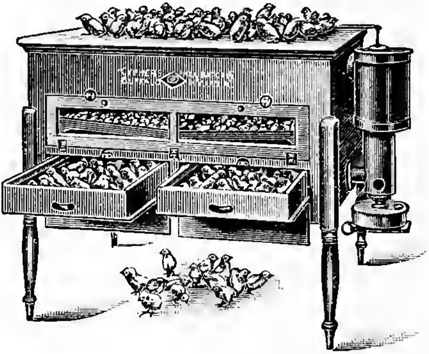

Fig. 40.—Cypher's Incubator.

Poultry-keepers are too frequently tempted to force production without considering the relation that cost should bear to returns, and under some circumstances increased output may be obtained actually at a monetary loss. Both in the matter of egg and flesh production there may be every appearance of profit without its reality; and where a doubt exists as to whether the business has been worth the trouble and cost, the blame is very often laid on competition or the unfortunate "middleman," instead of on what is really the case. The selection of feeding-stuffs and their relative cost affords a fine field for error, as "cheapness" and "dearness" are purely relative terms, according to the final market value of the finished article and the quality of the same. In the case of stock birds, for example, where there is a lengthened rearing period, it is not desirable, though at times it might be very tempting, to use inferior foodstuffs, since these would hinder the building up and development of the frame. On the other hand, where fowls or ducks for the table are concerned, with the exception of those of the highest class (and in that case the relatively high cost of production is balanced by the market value of the finished specimen), it is quite allowable, in view of their short span of life, to use foods which, though they tend to hasten the production of a marketable condition, are yet of an inferior order to those foods provided for birds which afterwards form part of the stock of the farm. Without the keeping of accounts, facts like these are apt to be overlooked, since the conditions vary much in individual cases and from year to year, and this is undoubtedly the difficulty the poultry farmer has to face when he is endeavouring to cut down expenses. Nothing looms larger in the balance-sheet than the labour bill, and there is an amount of hard work on a poultry farm of which few outsiders have any idea. It is necessary to have the gift of handling men in order to get the most out of those employed, and one very important part to consider in the case of the permanent employees, is the exacting nature of the work, since the birds can never be left Sundays or weekdays, and the hours are bound to be long. As far as possible, the place should be planned so that the work can be done with the minimum of outside labour, since the more immediately the work is under the master's eye the better will it be carried on, and the more economically. One cannot help being struck by statements made by men of experience, to the effect that profits ranged comparatively higher when the work was attended to by one or two men working directly under their own supervision, than when, owing to the big scale of operations, a large staff had to be employed, which was of necessity less subject to supervision.

**Women and Poultry-Farming.**—A question frequently asked is, Are women likely to make successful poultry farmers ? and whilst a few pessimists here and there hold the negative opinion, the general consensus of opinion is that, given a love of the work, a sufficiently complete training, and adequate capital, the practical, hard-working woman poultry farmer has as equally good a chance of success as her brother. Very many instances could be given of women who are making their living out of poultry-farming, and a good living at that, some purely from utility work, others from a combination of fancy and utility. In some cases the proprietors attend to the whole of the work themselves, or employ the services of other women; in others the labour of a couple of men or boys is employed in addition.

If up-to-date methods are adopted, much of the old heavy work (moving heavy houses, for example), which was said to render the occupation an unsuitable one for women, can be dispensed with, and there is as much scope for women poultry farmers in this country as there is in France, Belgium, or Denmark, where for the most part the poultry-keepers are women. The woman contemplating this business should be active, energetic, and methodical, having a good business head and a thorough knowledge of the work, and able to give personal attention to all branches of her industry. In our opinion, provided the difficulties are fully realized and there is a genuine love for the work, a woman is essentially suited for the pursuit, and the fact that so many are already making a really successful thing out of it goes far to disprove the assertions to the contrary made by pessimistic people.

Certainly there have been failures here and there, but they are attributable for the most part to causes similar to those which have been at the root of masculine non-success; and were we asked for a definite opinion on this matter, we should say without hesitation that there is, and will continue to be, an excellent future in poultry-farming for women.

**Daily Round.**—It is not our purpose here to outline a daily scheme of work for the poultry farmer—methods will vary in almost every case, according to the particular branches of work undertaken—but the following rough summary of the details which will have to be attended to on a general poultry farm of any size will give the inexperienced some idea of his possible future duties. Each section—the layers, the breeders, the young stock, the fattening birds, and the moulting fowls—will have to be separately dealt with. Foods will have to be selected, blended, and mixed, the large coppers which supply the hot water being watched meanwhile. All sections of the stock have to be fed with their appropriate diet (during the breeding season all the male birds should be fed separately from the hens); water must be supplied in every quarter; water troughs, food pails, and mixing troughs, thoroughly cleaned; fresh bones ground up, and roots pulped. Every incubator will have to be visited, lamps filled and trimmed, the thousands of eggs on a big farm

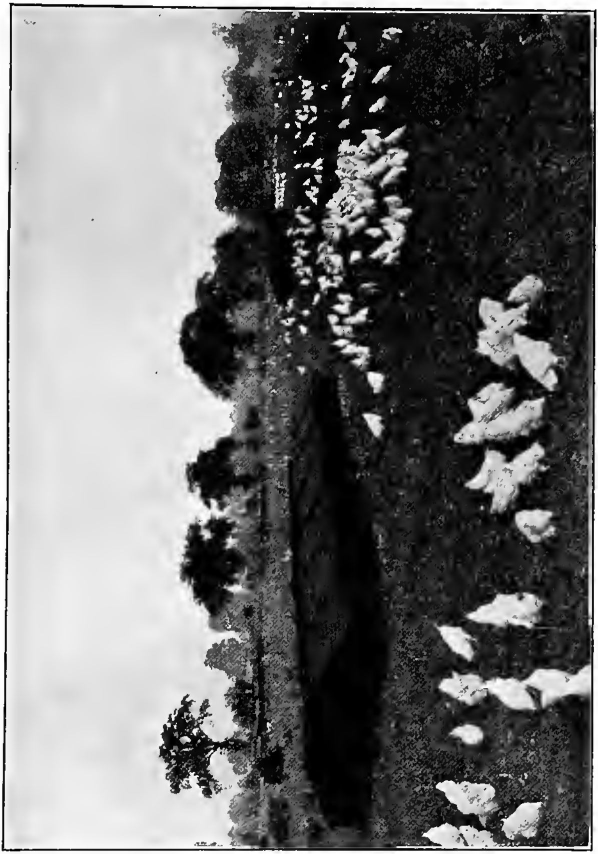

Fig. 41.—Poultry Farm: Flock of Layers, showing Houses in Use on Mr. Toovey's Farm at King's Langley.

turned and tested, whilst between each hatch the machines have to be washed out and disinfected. Broody hens must be taken off, fed, watered, dusted, and watched back on their nests ; chickens require constant attention ; coops, brooders, and brooder houses must be kept scrupulously clean ; day-old chicks selected and packed for despatch orders ; young birds ringed in order to distinguish their strains ; eggs for market collected, stamped, packed, and despatched ; eggs for own use or for hatching orders collected, stamped, sorted, and despatched ; moulting stock attended to ; houses cleaned, dropping-boards scraped and disinfected, perches disinfected and creosoted ; fresh litter, flint grit and oyster-shell supplied where necessary ; fowls dusted regularly with insect-powder ; ailing birds isolated and treated ; adult stock for sale sorted out and despatched ; breeding stock selected and mated-up for own or customers' orders ; fattening fowls trough-fed or crammed ; killing, plucking, shaping birds for market, etc.

Among these and other duties the day will be divided, and there is no gainsaying the fact that the work is arduous and exacting. Nevertheless it is full of interest, and offers many opportunities for fascinating study and original research ; and we consider that, in the light of modern science and under conditions of up-to-date working, this industry is one of the most promising of the " outdoor " occupations, and worthy of the serious interest and consideration of the intelligent and far-seeing man.

# CHAPTER VIII

## THE PLACE OF POULTRY ON THE FARM

Farm methods of the past—Drawbacks and advantages of poultry-keeping for the farmer—The colony system—Manuring the land—Birds on arable and pasture land—The stubbles—Selecting the best layers—The spring-chicken trade—Winter eggs—The fox question—Ducks, geese, and turkeys, for the farmer.

One of the most noticeable advances in agricultural opinion is the recent change of view with regard to the place of poultry upon the farm. Not very long ago it would have been hard to find a large farmer who would have condescended to talk " poultry " with any seriousness.

And to-day ? Go into any county of England or Wales, and talk with any class of farmer, large or small, and as a general rule—though there are still many exceptions—poultry-keeping will be discussed with all seriousness, as befits one of the most profitable side-lines of general farming.

The reason for this alteration in the point of view is not very far to seek.

**Old-fashioned Methods.**—At one time—not so very long ago, either—the fowls kept upon the farms of this country were intended merely to supply the needs of the house, and as such were left to the haphazard care of anyone who might happen to take a passing interest in them. The farmers themselves never believed in them at all from the point of view of money-makers, and any outlay in the shape of good houses, pure-bred stock, etc., was never dreamt of. A collection of mongrels for the most part were to be found—as, indeed, they are still in some benighted spots—scratching round the homestead (of all others, the place where poultry can exist most unprofitably); laying when and where they pleased, half the eggs being stolen by the farm hands ; the birds living on a liberal diet one day and starvation fare the next; allowed to sleep in dark, noisome "roosts," which rarely received the luxury of a coat of whitewash, and were seldom, if ever, cleaned out. The stock rarely received the renovation of new blood, mating being carried on in the most casual manner, and inbreeding being disastrously common; while hens were allowed to exist many years after their productive powers had ceased to be valuable. As a natural consequence, poultry did not pay, and small wonder. Yet this picture was not a lurid conception, but the general rule, and it is time to say a word in praise of the much-abused "fancier," since it is undoubtedly to him that we owe the preservation of our native breeds in their purity, as well as the introduction and production of very many breeds which figure so largely, from the utility point of view, in the public eye to-day. We mention this because many utilitarians appear to take a delight in abusing and belittling all those who take an interest in breeding and exhibiting "fancy" poultry, and a timely recognition of the debt we utility poultry-keepers owe to their efforts may not be out of place in this work.

**Agricultural Depression and Small Industries.**—The gradual change which has come over the farmer's opinion is due to a good many causes. A well-known agriculturist stated in one number of the *Quarterly Journal of the National Poultry Organization Society* that the reason farmers did not go in more extensively for poultry was that they had too much money. Certain it is that the bad years which existed for agriculturists towards the end of the nineteenth century drove the British farmer to pay more attention to the smaller sources of revenue, which he had previously regarded—unlike his Continental neighbours—as too small a matter to be seriously considered. Poultry-keeping was one of these "side-lines of agriculture."

**Propaganda Work.**—Books and magazines began to appear, in which useful hints and suggestions were put forth, and that pioneer society, the Poultry Organization Society, was founded. Under its auspices much valuable literature has been circulated, co-operative societies have been organized, and lecturers engaged to do propaganda work. The Board of Agriculture began to wake up to the importance of the new movement, and on its own account disseminated literature which was, and is, of the highest practical value. With the organization of the Department of Agriculture and Technical Instruction for Ireland in 1900 a most valuable impetus was given to the poultry industry in Ireland, and to-day the small farmers of Connaught, Leinster, and Ulster, reckon poultry among their most profitable stock.

**Drawbacks to Farm Poultry-Keeping.**—It may therefore be taken for granted that the majority of farmers are to-day interested in a greater or less degree in poultry-keeping, and the point now to be considered is, How can present methods be improved, and what is the most economical and profitable form of management? For it must be recognized at once that the farmer possesses peculiar advantages and disadvantages in the matter, the latter being, however, few in number. Broadly speaking, the drawback to poultry-keeping on a farm is the mass of petty detailed work which it entails, and which is sometimes difficult to fit in with the ordinary routine. It is this collection of small duties which has sometimes disgusted the farmer who has his hands already full with the daily round of a farm. Yet it is difficult to see how the other branches of farming—stock-raising, milk-selling, or corn-growing—could ever have been made to pay if difficulties had not

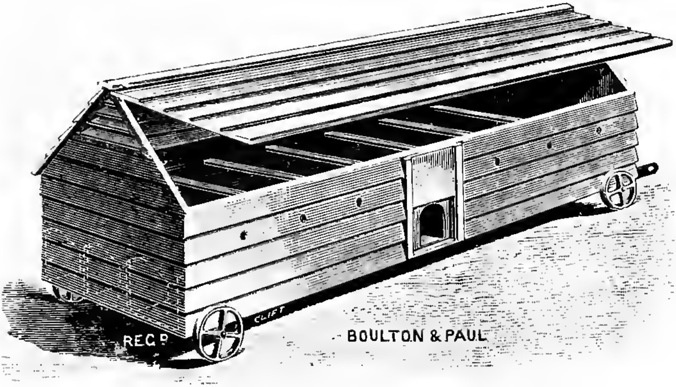

Fig. 42.—Movable House for Use on Farms.

been wrestled with, and if haphazard methods had been allowed to creep in.

**Labour.**—Then there is the question of labour, since the keeping of many head of poultry, and especially the rearing of chickens, takes up a very considerable amount of time. With regard to this matter, however, we are firm believers in the desirability of a regular poultryman being installed on all large farms, his wages being £1 a week upward, with a little extra for the chicken-rearing season.

Such a man would work the poultry at a profit just as much as any other skilful agricultural worker, and the busy farmer would—provided he engaged the right man—only be required to give a weekly consultation as to the disposition of the birds about the fields, and the feeding problems which the different seasons might present; and, of course, a general supervision would be exercised over the whole. It is a mistake to relegate the care of the birds to any casual person. Poultry-keeping on a farm is pretty hard work when one considers the distances to be traversed and the heavy weights to be carried; and since the success of poultry-keeping mainly depends upon the personal interest and enthusiasm of the person undertaking it, it is essential that the farmer secure a man who is keen and up-to-date in his work. An advertisement in the poultry papers generally disposes of that difficulty, since there are to-day, fortunately, no inconsiderable number of hard-working, practical poultrymen, who would be highly valuable to a large farmer if permitted to use up-to-date methods in their work.

**The Fox Question.**—Poultry-keeping in a fox-hunting district is often difficult for farmers, and losses are sometimes heavy. With the great increase in the number of poultry-keepers every year, the question is becoming more acute, especially in some districts. Farmers are as a rule the greatest sufferers, owing to the freedom of their birds; and while compensation is often obtained, it rarely covers the actual loss. At present the question is a thorny one.

**Advantages of the Farm.**—These far outnumber the drawbacks enumerated above. In the first place, the farmer has no rent to charge for his feathered flock, since they displace no other stock, and their account can be reckoned in with the four-footed beasts on the land. There is no fear of tainted ground, the fresh pastures, newly ploughed arable land, and stubbles, providing ample room for young as well as adult birds. The food bill need not be heavy, since not only do farmers' birds, ranging at liberty, secure nearly half their living for themselves, but surplus crops can be economically utilized, and grain that is sound, but of poor quality, will help to fill the birds' crops.

Again, fowls kept on free range are much more healthy, as a general rule, than those kept in confinement, or at least they are less liable to disease, since their active habits keep them in better condition, and that, again, tends naturally to better results. Another and a very great advantage consists in the valuable manure deposited by the fowls on the land. This point is not always thoroughly understood, and many farmers who have not tried the experiment still hold the opinion that poultry spoil good pasture. As a matter of fact, the case is exactly opposite, numerous instances being brought forward every year of yields of hay being greatly increased by running poultry on the meadows, and of poor pastures being enriched and made more valuable, not only by the manure, but by the fact that poultry tend to increase the finer grasses at the expense of the coarse ones. The mistaken idea that poultry do damage has probably arisen because careless farmers have habitually kept large flocks of fowls in a permanent house in limited quarters, the natural result being, of course, that the grass gets worn down round the house and where the fowls are fed, and the land in consequence becomes foul. But since that is directly opposed to the principles of profitable farm poultry-keeping on correct lines, it does not affect the general truth—*i.e.*, that poultry is directly beneficial to the land, and damage to the grass infinitesimal.*

**The Colony System.**—To deal now with the best methods for adoption by the farmer. The fowls do best when kept in the modern and approved style—*i.e.*, the "colony system," which consists simply in distributing the stock very widely over the farm in portable houses, which can be shifted from field to field, instead of allowing the hens to congregate round the homestead, roosting in a permanent house, and making the whole place look untidy when they roam about the yard. This plan enables the farmer to increase his head of stock very largely, and to keep them much more economically than the small poultry-keeper. The use of permanent houses instead of movable ones means a great annual loss in manure (which in the latter case is evenly distributed all over the fields), and also involves much unnecessary cleaning. It is folly to erect pens and use up posts and netting when there is free range available. The portable houses are not expensive—one can get a very good one for £3 or £3 10s.—and when they are well and strongly made the depreciation on them is very small, and it is noticeable that even after years of hard wear they always fetch very good prices at sales. It is advisable to have them strongly made, since horses and cattle have an awkward habit of finding out the weak places in a thinly-built house; and they should have broad rims and fair-sized wheels for convenience in moving in the fields. Still, they must not be too heavy, since that would increase the labour of moving. Those on wheels or the "sledge" type of house are the most suitable for field work, but with the introduction of the "Trollever" the problem of moving presents little difficulty, since two men with its aid can shift the heaviest portable house from field to field in a few minutes. All that is required besides the machine itself, which is easily adjusted, is a pair of wheels costing a few shillings.

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* For interesting examples of farmers who have testfied to the value of poultry on their farms, we would refer the reader to the revised edition of Lewis Wright's "Book of Poultry," as we have not space to deal with particulars here.

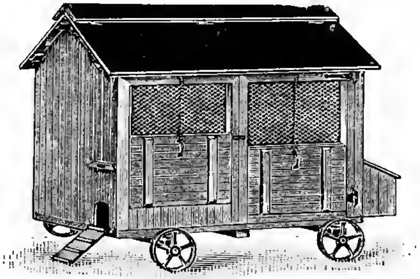


FIG. 43.—ANOTHER TYPE OF FIELD HOUSE.
(A. E. W. Phipps.)

**Manuring the Land.**—To get the full benefit of the manure on the land, and to have it thinly and evenly distributed, the houses should be moved a hundred yards or so every few days. This quite does away with any danger of the grass being trodden down or of bare patches being caused, especially when the precaution is taken of feeding the birds in different spots daily, broadcasting the grain over alternate strips of land. When it is desired to increase the yield of hay in a particular meadow, the plan is often adopted of running a fairly large head of poultry on the land from August or September to February, and very heavy crops are usually the result. Such heavy manuring would not be necessary every season, and the fowls can go on to another piece of pasture the next year, and, of course, on permanent pastures it is not advisable to run the birds so thickly on the ground. The old prejudice that other stock will not graze after poultry is an entirely mistaken one, and, as a matter of fact, both sheep and cattle *like* to graze on ground which has been run on by poultry, and will follow the poultry houses about as they are moved, presumably because the grass grows richer and finer after the fowls have been over it in reasonable numbers.

**Number of Fowls to the Acre.**—Authorities differ a good deal as to this matter. The more ground the fowls have to range over, certainly the less they will cost to keep, as so much of their food they can hunt out for themselves. A good deal, of course, depends upon circumstances. For instance, gravel or sandy soil will remain pure and sweet considerably longer than heavy loam or clay, but it does not contain one-quarter of the animal life which a rich soil does. Where cropping is regularly practised, as it is upon farms, the land is constantly being sweetened, and a greater number can be kept than if the birds were restricted to pens or limited pastures. Where other stock is running over the land, twenty to the acre should not, in our opinion, be exceeded; but given a wide range, and the run over arable as well as pasture land, 100 to the acre should not foul the land for a good many years, though we should not like to say that it would not do so eventually. At the same time, we do not advise so many, because of the reason given above, that much more food would have to be supplied than when the fowls could be run thinly—say thirty or forty to the acre. The annual manurial value of a fowl is reckoned by the Board of Agriculture at 1s. per head; but we are inclined to rate it higher than that, since there is the young stock to be reckoned with, and the excreta from fatting fowls, which is highly valuable. The manure of fowls is especially rich and concentrated, and each fowl is calculated to produce nearly a hundredweight in the course of a year. It should be regarded as one of the most valuable fertilizers farmers possess, and not allowed to be wasted in the yards or on waste soil. It is more valuable if partially dried, since if it is simply stored while fresh much of the ammonia is lost. Market gardeners learned to appreciate its value long before the general farmer, and will always give good prices for it. Light dressings will be found as a rule to give the best results, the manure being so highly concentrated, and many authorities recommend mixing it with dry earth or wood ashes, never with lime, as is sometimes done.

**Weeding out the Stock.**—On many farms, before beginning with the colony system, it may be necessary to clear out the greater part of the old stock, disposing of old hens to the higglers, in addition to any weedy, unlikely pullets. Spare cockerels can be fattened up and wasters weeded out, only the best pullets and any specially good laying hens being retained. Any old houses which are to be kept for different purposes—as, for example, an isolation hospital—should have their surplus fittings removed, a thorough disinfection and fumigation carried out, and a coat of limewash given. The new colony houses can then be put on to the meadows or arable land, and the stock transferred to them.

**Size of Flock.**—We consider twenty-five to thirty is quite as many as should be put into an averaged-sized colony house, and our own opinion is that the birds do better in small than in large flocks. There is the additional safeguard that, if any disease should make its appearance, it will be easier to lay hold of it at once. On a 200-acre farm about fifteen colony houses might be run, with thirty birds in a house, giving a laying stock of 450. A larger head could easily be run, but this might interfere with other stock.

**Arable Land.**—Running the birds on arable land requires rather more judgment than pasturing, but is even more advisable. The birds can obtain innumerable worms and insects in freshly ploughed land, to say nothing of the twofold benefit of the manure they deposit upon the land and the harmful insects they take *out* of the land. Wireworm in particular can be largely eradicated from a field by the running of a fairly large head of poultry upon it.

Of course there are only certain times of the year when the birds can be allowed on the land, but with a little planning and forethought their stay can be lengthened out considerably.

In winter, for example, there is little to be found in the pastures, but the birds can be on the land without doing any damage. A fortnight after ploughing is, however, long enough for them to do much good, stale ploughed land being of little value for them. To obviate the difficulty of the wet land we observed a successful plan carried out by several up-to-date farmers in the north-eastern district of Yorkshire, where a good deal of very modern enterprise prevails. As each field was ploughed the headlands were left unploughed for a time, and the colony houses had therefore a piece of fairly dry solid ground where the hens were fed, and where they could rest, going foraging over the sticky land in the intervals. When the next field was ready (again except for the headlands), a horse pulled the house through, and the team returned to the first field on its way home, and ploughed up the bit which had previously been left. A vast amount of food is saved by letting the layers follow the plough, allowing the young stock the benefit of the rich pasture. In the spring-time there is no need to leave the headlands unploughed, since the land is less heavy, and the birds can remain on the pasture after that, or on the fallows when the hay meadows are shut up, coming back on to the fresh clean land after the hay is carried.

**The Stubbles.**—The stubbles in autumn form a splendid ground for the young birds as well as the layers, and there is no reason why the wild birds should have what might be much more profitably disposed of. With the advent of the self-binder—which often means a shedding of three bushels to the acre—the opportunities for poultry have become great, and there is much waste of good food in fields and hedgerows in addition. Backward young fowls put on the stubbles freshen up wonderfully, but the pullets and cockerels must not be allowed to run together. We are in favour of giving the pullets the preference, since the grain diet and abundance of variety and exercise will get them into splendid condition for the autumn. There is plenty of animal and vegetable food to be found, and enough corn for a good-sized flock. The birds should be handled frequently to see if they are in condition, as sometimes, though they may look well, they are not in reality getting sufficient to eat. A keen eye must be kept to notice exactly how the corn is lasting out, and the houses should be frequently moved, so that all surplus corn is cleared up and the manure evenly distributed. The water-supply must be attended to also, as birds on the stubbles cannot as a rule obtain this for themselves. Since the sun is still hot, an earthenware fountain, which does not get as heated as an open dish, is the best vessel to provide, and fresh clean water must be supplied at regular intervals

**Feeding of Farmers' Birds.**—This does not differ greatly from that of other fowls. They do not require as much food, but it is a mistake to suppose that any cheap or non-nourishing food will do for them. What they have should be good. In winter we think the warm morning mash gives the best results, together with a small quantity of wheat and maize at night; but in late spring and summer a good handful of wheat in the morning will be all that is found necessary. Some skim milk, which is generally left for the benefit of the pigs, can be given very profitably to the chickens, and the waste produce from the vegetable-garden can be shared among pigs and poultry.

**Selection of Stock.**—It is important in the first place to obtain the layers (either by purchasing them as pullets or by hatching from sittings of bought eggs) from genuine utility strains which have been bred for laying. Mis-marked exhibition stock is often sold for utility purposes to farmers, and too frequently the results are bad. Fowls kept for utility purposes must have been bred for their work, and now that there are so many poultry farms in England which make a speciality of breeding for laying purposes, there should be no difficulty in getting hold of a good strain. The farmer is advised to keep general-purpose fowls—since chicken-rearing is an important item for him, and some broodies will be required—and a flock of "layers only" in addition. Among the pure-bred fowls, the Sussex, the Buff, White, and Spangled Orpingtons, the Rhode Island Red, White Wyandotte, and the Rock family, are to be specially recommended; whilst Anconas, Leghorns, and Campines, will serve to fill the egg-basket when the sitters are busy. Cross-breds—not mongrels, but good first crosses—do as well for the general farmer as any, since they are generally healthy, hardy, and vigorous, and there are so many good crosses that it is difficult to particularize.

Among those which perhaps lean more towards the table poultry side than the other, one might mention Faverolles-Orpington, Faverolles-Sussex, or Houdan-Orpington; while the Houdan-Leghorn, Buff Orpington-Buff Leghorn, or Leghorn-Buff Rock, make magnificent "laying machines." What is known as the "one-pen cross" consists in mating cross-bred hens in alternate years with a cock of one of the two breeds, thus preventing the mongrel type. Thus, a Houdan-Leghorn hen could be mated to a Leghorn cock, and her progeny next year to a Houdan cock, coming back to the original starting-point.

Elaborate trap-nesting would take up too much time for the farmer, but some attempts should be made when breeding to pick out the best layers to use for that purpose, and the old definition of the good layer as the energetic scratcher who is always first down from the perch in the morning, and the last up at night, is not a bad working theory.

A good stock cock or good cockerels will raise the quality of flocks in a couple of seasons; and since the male bird is half the breeding pen, it is equally important that he should come of good utility parentage. One of the greatest mistakes is to let the male bird run with the hens all the year round. Vigorous chickens cannot be obtained when the parents are worn out, and there is nothing to be gained in the matter of egg production by letting the cock run with the hens. Spare cocks can be put in one of the colony houses or kept in a spare shed; they will be much fitter for their work at the times when they are required. In the summer months it is distinctly better that males should be separated from the hens, since unfertile eggs will keep so much better. When there are many broodies about, they are only too keen on keeping eggs warm, and will collect all they can beneath them, the warmth of their bodies assisting in the development of the germ in the eggs, thus doing a good deal of harm from the market point of view if they are not discovered in time.

**The Spring-Chicken Trade.**—It is a good plan to mate up a few pens which can be kept near the yards in the autumn, so as to have a few broods of early chickens, than which nothing is more profitable to the farmer if it is not overdone. Chickens hatched in January can be reared in the shelter of the farm buildings; and since the farmer and his men will be more round the yards at that season, and will be less occupied than in the busy spring season, the youngsters thrive splendidly, and will bring in 6s. or 8s. a couple if they are of the right sort. Some of the pullets might be kept for stock, and if fed carefully they should lay through the early autumn, and possibly go broody in time to rear the next "winter chickens."

In order to get the fullest profit out of the spring-chicken trade, incubators and rearers should be used. There is no one so advantageously situated in the raising of flesh for the table as the farmer. With exceptional opportunities of clean ground, free range, and cheap food, the young birds will develop with great rapidity and at a comparatively low cost. Rearing young stock for the fatters, where it is not desired to finish the fattening process, is found a very remunerative business. Seasonable hatching is a very necessary item in making the most of this business, bearing in mind the tremendous demand, as yet largely unsatisfied, for good-class spring chickens; indeed, all the year round Surrey and Sussex fatteners will give good prices for twelve- or fourteen-week-old chickens in lean condition which are well grown and of sturdy frame. During the early months of the year, despite the fact that the production is so much more restricted, better prices commercially are to be obtained for hen-brooded chickens than for those which are artificially reared.

**The Winter Egg Trade.**—The egg trade must receive careful organization at the hands of the practical farmer. At the present day too many farmers are content to hatch their pullets too late in the season, simply because it is less trouble, and in consequence the winter egg-supply leaves much to be desired. We have been visiting in the country in the winter-time when even in the best of agricultural districts winter eggs have been almost unattainable on the farms, whereas in the summer the markets in the neighbourhood are simply glutted with eggs. This difficulty is overcome by correct hatching—late February and early March for the general purpose fowls, and April and May for the light breeds; whilst a flock of August-hatched pullets will fill in any gaps which may arise. It is not profitable to keep a hen as a layer beyond her second laying season, but as breeders, second-season hens are vastly to be preferred to pullets in our opinion, when mated with a vigorous young cockerel. Certainly, the farm birds which are exposed to weather will not lay quite so many eggs in winter as those birds which are kept in warm runs and scratching sheds, but they lay a great many more in the summer; and since the cost of feeding them is much less, we consider that the profit works out better. One large farmer has said that he calculated his laying hens (which, being of selected strains, *averaged* 150 a year) paid the rent of the greater part of his land.

**Fresh Blood in the Poultry Yard.**—Early-hatched pullets should not be sold, even though the higglers' prices may sound tempting, but kept to replenish the owner's stock, the fresh blood which is so essential for the utility breeder being supplied by unrelated cockerels bought from other quarters and introduced in the yards each year. Line breeding and inbreeding are to a great extent necessary in exhibition poultry, and in skilful hands little harm is done, but the farmer whose object is to supply flesh and eggs for the market will achieve most success where inbreeding is rigidly tabooed.

**Disposal of Old Stock.**—Old hens are most profitably disposed of by killing and selling privately as "boilers." Of course they can be disposed of to dealers, but these are rarely inclined to give very big prices, and if the carriage comes to very much all the profits are reduced to a minimum. The Jews purchase a large number of hens alive, since their religion prevents them from eating flesh other than that killed by their appointed priest; but again carriage and cost of conveyance have to be deducted from the price they are willing to give. If old hens are killed, plucked, and trussed, private customers can generally be found in the neighbourhood, but they would as a rule require the fowl to be prepared for table.

Another method of disposing of old hens profitably is to pen up a number in the winter or very early spring, when broodies are scarce, give them a good deal of warm nourishing food, including buckwheat, to induce broodiness, and keep them in a quiet and secluded corner until they get into a good "sitting" frame of mind. At this time of the year there is a great demand among exhibition poultry-keepers, and also among gamekeepers, for reliable broodies, and we know of one farmer's wife who makes a handsome sum out of her old hens, which she is able to dispose of at 4s. 6d. a head to a large exhibition poultry farm in the neighbourhood during the months of January and February, the order being quite unlimited. When she is able to send off twenty or thirty at a time at 4s. 6d. per head, one can understand that even the despised ancient ones have their uses.

Other farmers do well by the sale of a hen with her brood, many people not wishing the bother of incubating or purchasing unknown "day-old chicks," but gladly purchasing a clutch of chicks a week or a fortnight old, with their mother in attendance, from a reliable poultry-keeper of their own neighbourhood. An advertisement in a local paper generally brings plenty of purchasers willing to take the batch away themselves, thus saving the cost of carriage and disposing of the old hens of the flock.

**The Profits of Farm Poultry.**—It is a modest estimate that the gross annual return in sales of eggs and poultry should amount to £1 an acre, and on some very well managed farms, where the poultry is regarded as a money-making affair, it amounts to considerably more. At present there are thousands of acres up and down the country carrying no feathered stock at all, and many thousands more which might be supporting a larger number of birds than are at present running on them.

**Circumventing Foxes.**—In many districts fowl-keeping on farms is, unfortunately, rendered very difficult by the prevailing custom of preserving foxes. In order that fowls in free range should get the fullest benefit, it is essential that they should be out enjoying their liberty as early as possible after daylight the whole year round, and Reynard makes this impossible. The only way to be absolutely secure from his invasions is to have the fowls shut securely into their houses at night at not too late an hour, and only liberated when the round of work begins in the morning. One idea, which might be adopted more generally is to make a small movable run (not more than 6 or 8 feet square and 6 feet high, so that it can be easily shifted) made of 2-inch quartering, and wire-netting of suitable mesh and fastened on by hooks to the front of the house. This means a little more labour, but in a country where foxes are very numerous the most dangerous times are just when darkness is setting in and in the very early morning. If no run at all is provided, the fowls have to be shut into their houses before it is dark, involving a double journey all round for the farmer, since their feeding-hour will have been earlier. This is no light matter on a large farm, with perhaps twenty or thirty colony-houses to be visited. Then, again, they are obliged to remain in their houses till liberated in the morning, losing several hours of liberty and exercise, and the proverbial "early worm."

When a small run is provided, the last feed of the day can be thrown inside the run. The fowls will soon learn to come up for it, and after they are all inside the run can be fastened round, and all is safe for the night. Such a small run can be shifted in a minute, and as the house is moved about the field every two or three days, there is no fear of the land getting tainted or trodden into bare patches.

In addition to the ordinary fowl, the farmer has peculiar advantages in the rearing of turkeys, ducklings, geese, and guinea-fowl, which the small poultry keeper cannot possibly possess.

**Guinea-fowl** cannot be said to be in great request, though their flesh is of a distinct "gamy" flavour, but there is a certain demand which should be catered for. They are energetic foragers, and during the course of a year destroy an innumerable host of injurious insects ; and when they are trained from chickenhood to shelter and feed with ordinary chickens and fowls, they are profitable birds to breed. Being of a naturally pugnacious disposition, this last reservation is necessary. They require no housing, roosting in the trees or on beams, and pick up the greater part of their food about the yards and fields, If the birds are marketed in late winter or early spring their flavour is delicious, and poulterers use them to fill in the gap between game and early chickens in February, when both are scarce. The birds weigh about 3 pounds, and carry a good deal of flesh, which is dark in colour and on a small carcass. They sell for 3s. or 4s., and need no fattening for the table. There is also a good demand for the eggs for table use, as they are considered a great delicacy. From 1d. to 1½d. each can be obtained.

**Geese.**—The requirements of geese are such that only the farmer or those who possess much grazing-land can keep them properly and profitably. Goose-eating has to a certain extent gone out of fashion, but there are signs of a revival in the public taste; and since some rearers assert that they make as much as 3d. a pound on each goose they market, it seems a pity that more waste or common land should not be utilized as goose-rearing grounds. Where there is plenty of grass available, they can be kept (after the gosling age) at a very little cost in the matter of food; and geese are obliging birds in that they will thrive contentedly, though they naturally prefer good grass, upon land on which other stock could obtain very little food. Swimming-water is desirable for them, though they use water less than ducks. Such big birds need a large house, which need not, however, be in the least elaborate, and is preferably open in front except for netting. It is a mistake to attempt to house them with poultry, as some farmers do for the sake of economy, for neither bird gets on so well as when separated into its own natural class. Immature stock must be avoided for breeding purposes, and stock birds are best purchased in the autumn, so that they may be well settled down for the breeding season. At breeding-time it is well to give the stock birds a small feed of soft food in the morning and of corn at night. For Michaelmas geese about three weeks' preparation is necessary (after they have had the run of the stubbles), feeding with barley-meal, cooked potatoes, sharps and bran mixed with skim milk or meat liquor, with oats as a night feed. Geese which have been penned up together in yards for fattening must never be killed off in twos and threes, or the others will refuse their food and pine. All must be marketed together. Christmas fat geese must be very much bigger birds, and can be folded on turnip-fields with great advantage, and penned up for feeding at the end of October.

**Ducks.**—In all districts where duck-raising is conducted on very large commercial lines, as in the celebrated Aylesbury district, the work is divided between the breeders and the rearers, neither branch touching the work of the other. Where the production is small, as on the mixed farm, the two divisions generally go hand-in-hand. Stock ducks require sheltered valleys, with fairly light soil and abundance of swimming-water, in order to attain the greatest measure of success, though, of course, we are not suggesting that ideal conditions are indispensable. On most farms a good duck-breeding yard could be constructed without much trouble, the great essentials being plenty of pasture-land with access to running water and plenty of shelter afforded by trees and shrubs. A large pond surrounding

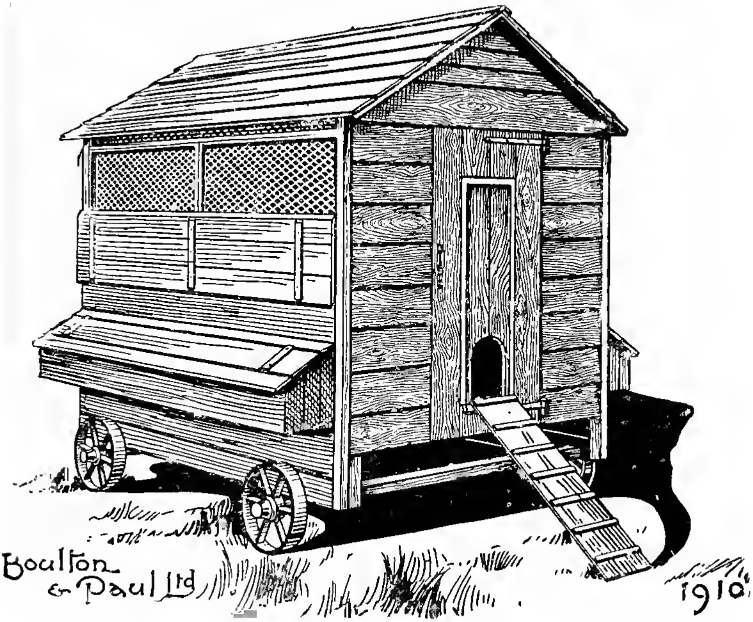


FIG. 44.—ROUGH FOWL-HOUSE FOR FARM USE (EXTRA STRONG).

an island where the birds can sleep, forms an ideal place for them. For ordinary farm stock an ordinary poultry-hutch does very well as a sleeping-place, but the floor must be out of the reach of water. Two drakes and five ducks generally give the best breeding results, and the mating should take place about October in order to get early ducklings. For general details of treatment of breeding ducks we would refer the reader to the chapter on Stock Birds.

Early hatching is essential if the best prices are to be obtained for ducklings, and for this reason the farmer is advised to adopt the Buff Orpington duck, since it provides fertile eggs so much earlier than the Aylesbury or crossed Aylesbury variety. Its build specially fits it for the table, and makes splendid ducklings for the early trade. The seaside resorts claim a large number of ducks and ducklings during the summer months, and the farmers in the neighbourhood of flourishing watering-places might make very much more than they do by marketing larger quantities of well-fattened ducks than are to be seen at present. The common practice of smashing down the breastbone of both fowls and ducklings unhappily prevails in many country districts, and this much militates against a good price.

**Turkeys.**—The farm is the place for turkey-rearing, owing to the wide range which can be provided to supply the continual appetite of these birds. Care must be taken not to overfeed during the winter months, or the turkeys will be in an unsuitable condition for breeding and laying in the spring. An orchard provides a good place for rearing the young birds, but the stock birds should have the fullest range possible until the penning-up time arrives. The whole process of rearing, in the case of turkeys, should be progressive right up to the fattening period, and it is to be feared that upon some farms this important fact is forgotten, and there is some neglect after the young birds have once got through their baby stage until the time comes for the final preparation. Such neglect invariably means loss, since a turkey cannot be hurriedly finished off in the same way, for example, as a fowl.

It is a mistake to breed from young turkeys, and three-year-old hens mated to second or third year cock-birds produce the best result. Degeneracy is, in the case of turkeys, the result of wrong methods of breeding and rearing, and of forgetfulness of the *partially* domesticated nature of the bird.

The turkey is a great forager, wandering miles in search of its food, and incidentally destroying much which would be very harmful to the crops. Where arable and pasture, scrub and wooded ground, can all be utilized, the birds will make the most of the natural food unattainable except by farm birds, and since the turkey takes a long time to grow to marketable size, the cost of its food would be a serious item were it not for this.

By using the American Bronze variety weights of 16 to 28 pounds may be attained, and it is to be remembered that the value of a turkey per pound is in proportion to its weight—*i.e.*, that 2d. or 3d. a pound more can be obtained when a number of birds attain a weight over 20 pounds each than can be obtained for a flock of birds only reaching 17 to 18 pounds.

Eggs produced by the stock birds as pullets must be allowed towards the cost of their keep till the birds are fit for breeders.

It is a mistake to sell the best breeders off the farm, and when any mating has produced good heavy birds for the market, the parents should be retained as long as possible. Once the farmers' prejudice against the turkey as a delicate bird is wiped out (such delicacy being very largely due to wrong methods of feeding and rearing), we shall hope to see put into use large areas of English country which are at present untenanted by the bird, although eminently suitable for its production.

# CHAPTER IX

## COMMERCIAL MARKETING AND ORGANIZATION

Foreign competition—Irish organization—National Poultry Organization Society — British Poultry Federation, Limited — Collecting depots — Marketing points — Formation of local societies — Egg preservation—Equipment of depots.

From time to time articles appear in our leading newspapers deploring the lack of enterprise shown by British traders in competing with foreign imports, and the poultry industry has always come in for a fair, or rather unfair, share of criticism on this head. The oft-repeated statement that the foreigner is ousting the British producer in the egg market is generally coupled with the remark that "millions of British money goes out of the country every year for eggs, which might just as well be put in the pockets of the British poultry-keeper." To a large extent and in the broad sense of the phrase this is true, but those critics who are loudest in their condemnation are usually deplorably vague in their suggestions as to remedies. They tell us how highly necessary it is that we should in our turn oust the foreigner from our markets, but we are left absolutely in the dark as to the methods we should adopt for the attainment of that object.

If it be solely a question of increasing our own output, necessary though that may be, we shall not be much better off. The natural result would be a reduction in prices, which would hardly suit the British producer, who often finds that it is hard enough to get a decent profit with foodstuffs at their present level of prices. Furthermore, we venture to say it would not affect the Continental importer, who would still continue to send in supplies so long as he found there was a small margin of profit beyond the cost of shipment; for in most cases (owing to lower railway rates and improved methods of marketing) he is able to produce at a lower cost than his English rival. In order to "starve the foreigner out" we should be compelled to produce at starvation rates ourselves, and the benefit would be a negligible quantity. So long as our markets remain open to the world it is extremely unlikely that we shall ever succeed in blocking the importation of foreign eggs and poultry. So that, if it be a question of increased production on our part, this must of necessity imply an increased demand, and that can only be stimulated by lower prices, which under average trading conditions—as they exist to-day—would tend to reduce the profit of the producer still more.

**Foreign Competition not altogether Harmful.**—For our own part, we consider that the foreign competition has not been an unmixed evil. In the first place, it has had an immensely stimulating effect upon our poultry-keeping industry, which would in all probability never have grown and developed in the manner in which it has done had it not been for the competitive instinct which has been aroused. Much of the educational and organizational work which is beginning to bear fruit to-day would never have been attempted if the need for enterprise in recapturing the market had not been very pressing.

Then, again, the genuine new-laid egg and fatted fowl were articles of luxury not of general diet (except among a certain class of the population), not so very many years ago, and their prices were such as prohibited their being brought into common use. By the introduction of cheap foreign supplies the taste for eggs and flesh has been encouraged and developed among all sections of the community, to their present benefit, and to the future prosperity of the British producer.

Much of the Continental trade is in eggs of an inferior order, principally the Russian eggs, many of which are almost rotten when they arrive after their thirty or forty days' journey, but which serve admirably for the numerous manufacturing processes for which they are used. It is absurd to suggest that the British egg, which costs far more to produce, can possibly compete with imports of this class. As conditions of life in Eastern Europe improve, it is possible that Russian eggs will rise in price; but at present the standard of living in the remote country districts from which the bulk of the eggs are collected is very low, and the fowls receive little attention, picking up most of their food themselves; consequently they can be shipped into this country at extraordinary low prices. There is really no evidence to show that "the foreigner has ousted the English from the market," or that English eggs cannot be sold because of foreign ones. The case is simply that the demand for flesh and eggs suddenly increased, and as the British producer could not or would not supply it, the foreigner stepped in and took his place. That the average English person much prefers to deal in an all-British supply of food is easily shown by the fact that such a supply finds a better market at a higher price *whenever it can be obtained and guaranteed.*

**Increased Consumption.**—Of late years the increased demand in this country for eggs and poultry has been enormous, especially in the large towns, and side by side with the increased demand has come an increase in values. In the London market our own new-laid eggs fetch from 17s. to 22s. the "long hundred" during the months of December and January, which prices are above French top prices; and it is noteworthy that this market has grown up in the face of foreign competition—a proof, if necessary, that the British producer has not been standing still, since he is selling many more eggs, and those at higher prices, than formerly. Moreover, market sales do not include the whole of the business done, since thousands of small packages are sent to private customers by post or rail.

It is not, therefore, an increased production *solely* which is necessary, since we see that a steady growth has been taking place both in the production of flesh and eggs of late years. What is needed is a still higher standard of quality, together with an improvement in our somewhat antiquated methods of marketing.

**Continental Methods.**—If we glance over the list of countries which send poultry and eggs into Great Britain, we shall see how closely this question of marketing is connected with their successful trade.

**France.**—Here there is a great demand for eggs and flesh, and much poultry-keeping is done on the small farms, principally by the women. Every town or village has its weekly market, to which the egg merchants send their vans, buying all they need and carting away to the central warehouse, where the eggs are tested, sorted, carefully packed in clean white straw, and despatched as quickly as possible. Eggs from France can be placed on the London markets within four days, and in the "new-laid" trade France is a serious competitor. When we remember that the average British egg is a week old when it goes to market, we shall easily see how our nearness to markets is sacrificed. Eggs only three days old have no foreign eggs to compete with, and, as the price is largely determined by the age, can command the top prices.

Customers are naturally willing to pay the higher price if the eggs are guaranteed "new laid," but naturally if the British egg is only of equal value with the French or Danish egg, there is no special inducement to purchase.

French export trade in finished fowls is for the most part confined to the Christmas markets, and the bulk of their stock is of the highest class and "ripest" finish.

**Denmark.**—The time in which Danish eggs can be placed on our markets is from seven to nine days, and here we have an example of what proper organization can do for an industry. It was only in 1894 that the Danes seriously adopted the co-operative method of dealing with their export egg trade. To-day there are more than 500 village societies, with a membership of over 40,000, and in this short time this enormous industry has been built up on a co-operative foundation. As Mr. Edward Brown pointed out in his highly-interesting report on the poultry industry of Denmark, there were many difficulties to be met with—the distance from the most profitable markets, the over-sea journey, necessitating good-quality eggs and careful packing, etc.—but in spite of this the Danes managed to build up a reputation for supplying a reliable article which has not yet failed them. The State-owned railways have certainly materially aided in this work, as the rates for carriage are very low, as are also the steamship charges for freight. The breeds kept are mostly of the non-sitting type, which accounts for the prevalence of the white-shelled eggs and for the smaller production of winter eggs, some depots estimating the different rates of production in summer and winter as 50 to 1. Eggs are stamped for the most part, though a large number are sent out guaranteed but not stamped, according to the preference of customers. Each packing-centre draws its supplies from a wide area, and employs a number of collectors, the producers being paid cash and the collector about ¼d. to ½d. per pound for collecting. As a rule the packing-station provides the boxes and pays carriage where a collector sends his supplies in by rail. Dirty or stale eggs are almost unknown at the centre, though all are tested and graded before being shipped. During the cheap season large quantities of eggs are preserved in cement tanks, and retailed at a slightly lower price during the winter. The organization of the egg trade is practically perfect, and though the British farmer is on the whole averse to co-operation, it is certain that it is upon these lines we must combine to organize our trade if we wish to recapture the home market.

**Russia.**—The Russian egg trade has already been touched upon, and can hardly be considered as a serious menace to the first quality British egg trade, considering the distance traversed, the slow collection, and the widely differing quality. The dead poultry trade (frozen, of course) is of large dimensions, and the birds usually arrive on the London market at an early season of the year, restaurants being the chief consumers. This trade is rapidly growing, and the prices run low, the packages being carried at absurdly low rates by the Government lines of railway to the Baltic ports, where they are shipped to England.

The cold-storage trade has had some effect in steadying the market, but all countries exporting goods of this class can only compete with second-quality British, as, once gone into store, a bird has to be sold for 6d. or 1s. less than if it were fresh, and has to be used immediately it is brought out. In the early spring months, when British chickens are conspicuous by their absence, the Continental birds arrive in the nick of time, neatly packed, and though the average British salesman would much prefer selling home-grown birds if he could get them, he has to make up for the lack of regular British supply by disposing of the imported frozen goods.

**Germany** is steadily absorbing a good portion of our supply of foreign eggs and birds, and whilst in the long-run it may be beneficial, tending to develop our resources more rapidly, we have at present to meet a large increase in the price of good-quality imports, owing to the increased demand.

**Ireland.**—During the last year or two Ireland has exported more eggs and poultry to Great Britain than any other country in the world, the growth of the industry in that country being quite phenomenal.

Some years ago the Irish egg trade got a very bad name for itself, being neglected and badly managed, and the whole poultry management of the country left much to be desired. The problem was first seriously tackled by the Irish Agricultural Organization Society, which began by spending several thousands of pounds in sending experts all over the country to preach the gospel of co-operation to the farmers, and in general educational work on modern lines, including practical demonstrations in fattening, plucking, packing, and marketing fowls, and in the Danish system of collecting, purchasing, and packing eggs for export. The work in Ireland has been aided further by the Department of Agriculture and Technical Instruction, which has, since its inception in 1900, given much practical aid, establishing public breeding-centres for the purpose of raising the standard of breeds kept, and instituting travelling poultry farms on the caravan system. The Irish Agricultural Organization Society has aimed at establishing local co-operative societies all over the country (which collect and forward produce in the most up-to-date marketing style), and has published many valuable leaflets in simple language, which have had such a bearing on the live-poultry trade by their hints as to selection and management of suitable breeds that the export of live birds for fattening into the Surrey and Sussex area has increased by leaps and bounds, and the prices obtained have been raised practically to those received in Sussex itself. Some societies are encouraging Irish fattening for the London and Liverpool trade, but at present the bulk of the export trade is in lean birds. There is, however, such a growth in the consumption of poultry in Ireland itself that much of the trade will be absorbed into that country, and the Sussex fatteners will have to look to English rearers to fill the gap.

With regard to the Irish egg trade, instruction has been carried out on Danish lines, the services of a Danish expert having been obtained. As an example of how the local societies have developed, we may mention one which exports 150,000 eggs weekly. As a rule the centre stations are in a seaport town or at a good railway centre giving easy access to a seaport. The local depots are all within carting distance of the central stores, and receive their eggs from members daily, purchasing for cash and by weight of eggs, not numbers. It is stated that the effect of purchase by weight has been most beneficial, Irish poultry-keepers being more particular about the breeds and strains they maintain, only looking favourably on those which lay eggs of large size. The eggs at the sub-stations are packed in divided boxes, each holding 1,000 eggs. On arrival at the central station these are tested, graded, and packed in export cases in the Continental style, three sizes of case being used, the largest holding twelve long hundreds, the next ten, and the smallest three long hundreds. The eggs are carefully packed in layers, each layer being composed of rows of a certain number according to the size of the box, and with practice the packing is done so accurately that the eggs occupy the same position when taken out as they did at starting. Wood-wool is used as the packing material between each layer, a 2-inch layer being placed at the top of the box, with a layer of dry clean straw above that. Breakages, of course, do still occur, though much less frequently, and in the majority of cases the fault lies with the railway and steamship company's porters, who have not

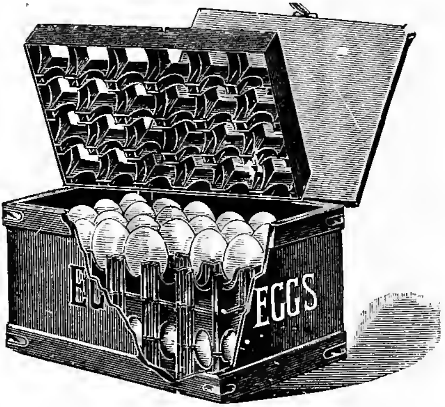


FIG. 45.—ROBINSON'S ANTI-SMASH EGG-BOX, SHOWING FITTINGS.

always the art of handling goods. It is hoped eventually to get the branch of trade on as high a level as the Danish export egg business, and, judging by the rapid progress which has already been made, there should be no doubt as to this.

At present the co-operative movement, though making great headway in Ireland, is not universal, the old methods of sale still prevailing in many country districts, where eggs are sold to higglers who sell again to the shippers, or to country shopkeepers who either resell or ship direct, or to the shippers direct at their stores. Although the practice of selling to higglers or shopkeepers has its advantages in rural districts on the score of convenience, the direct methods of sale are much preferable, as they check the bad practice of " holding over "—a practice which has done much to discredit Irish eggs in our markets—whilst purchase by weight instead of count obtains a better sample of eggs. Where eggs are sold by count the purchaser pays as much for soiled, stale, or under-sized eggs as he would for clean, fresh, and large ones ; and the competition in eggs being very keen, there is a tendency for the poultry-keeper to become slack as to *condition*, since it is to his interest to sell the small ones, and the buyer has to pay the all-round price. Where there is a regular system of selection and grading, and the poultry-keeper knows that stale, small, or dirty eggs will be paid for at a lower rate, a general improvement in the class of goods offered is soon seen. The difficulties of the Irish co-operative societies (and similarly in our own country) have been much increased by the failure of poultry-keepers to support the depot collecting from their district, thus much increasing the cost of collection of eggs. Where a creamery exists, it has been found a wise plan to run it in connection with an egg depot, and the practical difficulties have been easily overcome in districts where poultry-keepers have loyally worked together by providing a centre where shippers could rely on a steady supply of eggs.

Another point in which the co-operative poultry societies have been of great benefit to the Irish export trade has been in their better packing facilities. In many Irish markets eggs are sold in the open air, and in a wet climate this practice, leading as it does to packing in the open in bad weather, together with the use of damp straw and unseasoned cases, has had much to do with the past bad reputation of Irish eggs, which were often found to have a distinctly musty flavour on their arrival at Liverpool or London. Where a central packing-station exists, this difficulty is obviated, and the testing and grading, which can only be carried on in a suitable covered room, has been much facilitated. The use, too, of standard packages is being adopted on the recommendation of the Department of Agriculture, and a carefully-designed pattern has been planned out. The initial cost of standard packages is heavier, but, as stated in the recommendation issued by the Department, the general adoption would tend to a reduction of price, as the makers would be able to manufacture large quantities to standard size instead of having to arrange for various sizes and shapes to suit different customers, whilst, according to exhaustive inquiries carried out by the Department, the breakages of properly-packed eggs in the cases recommended for use should not exceed 2 per cent., provided reasonable care is exercised in their handling. Many individual shippers of Irish eggs have, of course, taken great care in the grading and packing of their supplies, but in the majority of cases Continental methods are superior (mainly owing to the larger quantities dealt with), and it is the Continental method which the Irish Agricultural Organization Society has taught to its affiliated societies.

**The Work of the National Poultry Organization Society.**—In 1898 the National Poultry Organization Society was founded in this country to get the home trade in poultry and eggs into a better condition, and from its commencement the society has aimed not only at obtaining better prices for its members, but also at raising the standard of quality.

The success of this society has been very great, and it is the duty of every poultry-keeper to support it in its work of establishing local societies and collecting agencies for the forwarding and marketing of local products. Already a good number of district associations exist, and it has always been found that an increase in the value of eggs and flesh has followed the formation of such societies. The producer and consumer have been brought into touch more closely, and the small sender, who, under ordinary conditions of marketing, is so severely handicapped by the large producer and the foreign importer, is able to have his small lot sold at a good price after the cost of preparing them for market has been deducted.

If egg and poultry depots were established all over the country, the markets would be much steadier and the wide variations existing in local markets to-day would not be found. Even in adjoining parishes there may be a difference of sixpence a dozen in the price of eggs, while in different districts as much as a shilling per dozen may even be noted, all this owing to our lack of system and organization. Uniformity and co-operation are the only watchwords to success, and so long as producers refuse to see that individual effort is a mistaken policy, so long will our marketing system lag behind that of our rivals.

The work of the society has been most uphill, and even now it has to fight many difficulties. The average British farmer has a rooted dislike to any form of co-operative effort, and much prejudice has to be broken down in some quarters. Members will not realize the foolishness of the practice of holding back eggs in order to get better prices later—farmers being the worst offenders in this respect—whilst for many years the importance of the winter egg-supply was under-estimated. Another problem has always been the temptation offered to members by local traders, who have previously fixed local prices, and are not overjoyed at the prospect of the market control slipping from their hands. Such men will often offer higher prices than a depot can give, even though the terms of the depot are above the prices formerly received by the individual producers ; and forgetting the latter fact, the members will sometimes desert their society and accept the trader's terms, with the natural result that the society is injured or even killed, and the old rate forced again upon the small producer.

When the National Poultry Organization Society was started, it was not meant to do more than organize producers in rural districts, and bring them into direct communication with retailers, making a general advance in quality and quantity of home produce at the same time. In this respect, and also in the effect upon ordinary traders who have correspondingly improved their methods, the work of the society cannot be too highly praised. It was, however, soon found necessary to assume responsibility for the control of the trading of the local affiliated societies, so a *marketing section* was formed, which has gradually developed very large proportions as the number of depots increased. It was then judged wiser to form a federation to deal with the sale of produce from the affiliated depots, and accordingly the *British Poultry Federation, Limited*, was formed and registered under the Industrial and Provident Societies Act of 1893, and established upon a co-operative basis. This has set the parent society much freer to attend to its real work of organizing the collecting depots and in the teaching of the details of collection, testing, grading, and packing, by the local societies as they are founded, without which knowledge the fullest advantages of the system cannot be attained by producers. The object of the local societies is not to make large profits, but to secure better prices for the produce. Nevertheless, in every sub-society established up to the present date both of these very desirable ends have been attained.

The premises of the British Poultry Federation are in the heart of the London provision trade, and its work and business done has exceeded the hopes of the organizers.

Every egg, whether large or small, new-laid or merely "fresh," even cracked ones, can find a market in this huge clearing house, to which new customers are constantly being drawn, many of them willing to purchase for commercial purposes eggs which could not have been sold at the provincial depots. In this way extra profits can be made for the local branches, as previously cracked eggs in particular were a source of loss. The Federation prevents the overlapping of work and any possible competition of the depots one against another, whilst the customers of the National Poultry Organization Society are assured of a constant supply together with regularity of quality, and even in the financial matters trading is rendered more simple, as instead of receiving several accounts per month only one is required, and that easily collected from this London clearing house with its able staff of experts.

It is estimated that the Federation will eventually be able to handle £70,000 or £80,000 worth of produce annually, and contracts for 10,000 and 20,000 eggs per week all the year round have been actually received during the past year of working.

Every egg is tested in a dark testing-room by means of a powerful electric lamp. All depots now consign their eggs to the clearing house, whence, after testing and grading, they are despatched to customers, each depot being paid market value for its produce, according to value and goods. The highest prices are given for first-grade eggs—those which are entitled to use the "Rose Brand" stamp of the National Poultry Organization Society—in itself a guarantee of quality—but each depot is also credited with and paid for so many "seconds" so many "cookers," so many "smalls," or eggs with dirty or cracked shells, according to the consignment sent up.

All profits, of course, go to the contributing depots in the form of dividends.

**The Street Collecting Depot.**—As an example of the benefits of co-operation, this branch is frequently and deservedly held up to popular notice. Since its commencement under the auspices of the National Poultry Organization Society in 1901 it has made rapid strides, every department showing a good increase each year. Street was one of the first depots to be started, and after eleven years' work is still the largest, its membership, reserve fund, profit, and dividends, all growing year by year. It commenced with 19 members and a small capital of £26; its membership to-day is well over 200 and its turnover close on £6,000. The wonderful growth of the depot has caused it to be removed from its own premises to a farm with spacious outbuildings and about 16 acres of land. There is a large incubator room fitted with 22 incubators, a fattening shed accommodating 700 birds, a tank room capable of holding

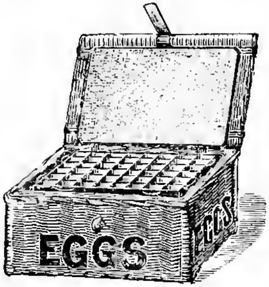


FIG. 46.—ROBINSON'S PATENTS, LTD.

8,500 eggs for preserving, a good testing and packing room, and outside ample accommodation for brooding and rearing thousands of chickens. In 1911 over 10,000 chickens were fattened, this branch of the work being found most profitable. It is interesting to note that in the table department, members, who wish to supply eggs to be "incubated" and the chickens reared for killing purposes, must keep a cock of a good table breed, the light breeds being penalized by the payment of 1d. per pound less for the birds. The advantage of the incubating department, especially to the small man, is very great, as he has no trouble with stock birds or broody hens, and day-old chickens and birds of all ages can be purchased from the farm. The day-old chicken trade has grown very rapidly and shows a good profit.

Each day the collecting van goes out on its ten-mile round collecting eggs and birds. It is estimated that the weekly cost of collection is about 25s., but that this is compensated for by the labour-saving in the testing room at the depot, and the regular supply, especially during hay-time and harvest, when the farmers have not time to bring the eggs in. This system of collection is of great convenience to members, who have the additional advantage of the better price obtained by the society, which is able to enter into good contracts with large companies for guaranteed "new-laid eggs," and also of the lower railway rates obtained by sending in bulk. The depot does not entertain contracts of less than sixty dozen per week, and requires that spring contracts shall be for double the number of eggs required by a winter contract. The members receive a higher dividend on winter eggs than on spring or summer supplies, since not only are prices much higher from October to March, but London merchants give marked preference in summer to the producers on whom they can rely to send a regular supply in the winter months, when they are most needed. Those members who bring eggs in large quantities during the winter months will make double profits, but this implies the keeping of suitable winter-laying breeds and the rearing of chickens at suitable times.

The Street depot has always insisted on scrupulous care in the collection of its eggs to avoid the slightest chance of stale or doubtful ones being included; and in its educational work (which is very regularly carried out in the neighbouring villages) lays particular stress on good, wholesome feeding, the free use of clover hay and fresh cut green-bone, and the best methods of obtaining winter eggs. The current local rates are paid for eggs sent in, and the margin between this and the sale price is held, and after payments of expenses and a provision made for the reserve fund, to which entrance fees and a percentage of profits is added the balance is divided among shareholders as dividend in accordance with the number of eggs sent in ; but members supplying more eggs in any month than four times the average number received from the months of October to December are not paid dividend on the surplus. This rule and the one relating to the extra winter dividend has been adopted to prevent members from taking unfair advantage of the depot by glutting the centre with eggs during the months when they are cheapest, and selling to other customers during the winter.

Members are expected to hold shares in proportion to the amount of business done for them. If they take payment in cash, the proportion is one share to every fifteen eggs accepted (the reckoning being made on the largest number of eggs accepted by the depot on any one day) ; but if monthly payments are made, one share to every thirty eggs. Members, however, who send *regular* supplies in by the collectors may claim that one-eighth of their monthly total be reckoned instead of their largest delivery.

The depot has invented its own egg-boxes, which are supplied for collection and also sold to outside customers. They are light, strong, and durable, wood-wool being used as the packing material.

Foods are also sold co-operatively, grain, meals, greaves, grit, etc., being obtainable at little above wholesale price ; and by purchasing through the depot members are not only purchasing cheaply, but are also lowering their own cost of production, making more profit on the goods sold to the depot, and securing a higher dividend on the profit made by the depot. It is easy to see how this principle can be extended by all depots. Where a member would have to pay the ordinary price for a house or scratching shed, a number could be bought by a depot at a reduction of 15 or even 20 per cent. By the co-operative system not only is the consumer brought into closer contact with the producer, but much of the intermediate expenses and profits is bound to be saved.

Organizations like that of Street ought to be extended into all parts of the country, all the knowledge in the world of every detail connected with poultry-keeping not availing the producer if he has no ready means of reaching his market. Every day brings the lesson home more clearly that only by rapid marketing of eggs and the use of correct methods in the fattening of fowls can the highest prices be obtained. Take the cost to a small farmer in a remote country district who has eggs or a few hampers of birds to dispose of. He either must sell to a higgler, who fixes his own price, or to the nearest shopkeeper, in which case there will be railway rates, carting, market dues, and salesmen's commission, to come out of his profit. Either from the consumer's point of view or from that of the salesman, who must always be an important link in the chain, it is obvious that lack of organization has its disadvantages.

**The Town Salesman.**—The position of the town salesman is one of great responsibility and full of worry; he has to stand between the buyer and seller, and if possible to please both. His customers vary between clubs, hotels, restaurants, etc. (all good customers, but very particular), and retail shopkeepers, who have the choice of several salesmen in the placing of their orders, and are often difficult to deal with. Irregularity of supply is the salesman's chief difficulty, poultry (the home product, that is) being constantly in demand, but fluctuating in supply. As we said before, in summer and early autumn there is often an excessive supply, but in the winter months a scarcity and an inferior quality of article, driving the wholesale man to the purchase of the frozen Continental supplies, with which he would gladly dispense could a regular British supply be maintained.

Again, in the egg trade it is still, unfortunately, a common occurrence for eggs to be held back even from one month to another, in order to obtain high prices, and producers will *not* learn that eggs over three days old have to compete with foreign eggs. They are frequently unreasonable enough to blame their salesman for not giving top prices for inferior quality, whereas for trade at new-laid prices it is essential that eggs should be marketed thrice a week, or at least twice. Though such a market might be occasionally glutted by an accidental rush of goods, still a steady market would be growing. To obtain a good reputation in the London markets as a *perfectly reliable* vendor (of an article which has earned so bad a name) is the work of years, and only those who have shunned the foreign and the "pickled" egg, dealing solely in guaranteed "new-laids," can hope to attain it, though such men never have the least difficulty in disposing of their wares even on a crowded market. But the salesman has to pay a huge rent in the majority of cases, and heavy

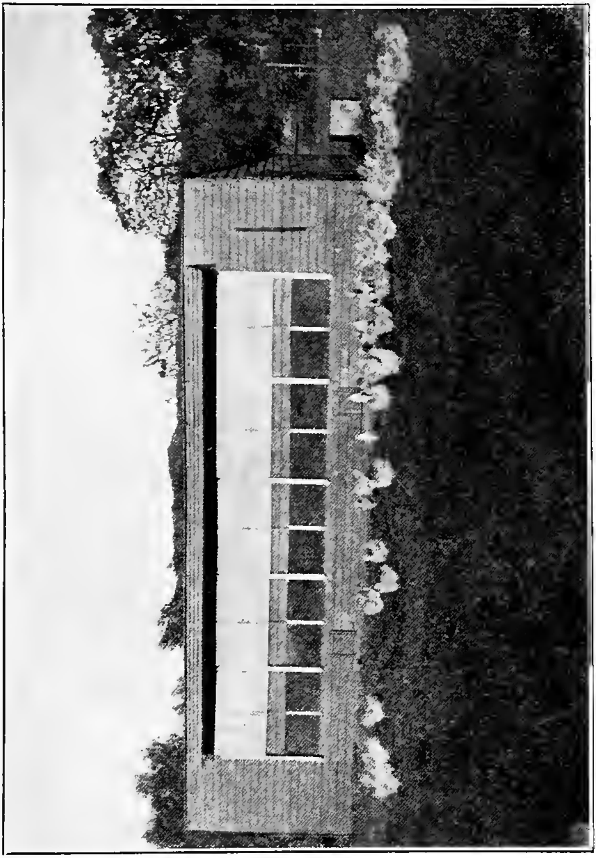


Fig. 47.—Intensive Houses, with Large Grass Run, at Mr. Toovey's Farm, King's Langley.

payments in the form of wages; whilst his losses in hot weather—often unavoidable—are severe, to say nothing of the loss by tainting, which occurs very frequently in spite of the printed notices (relating to packing of dead birds) circulated by many dealers among producers. A spell of extremely hot weather is certainly a golden opportunity for a dishonest salesman to defraud his customers, or a fraudulent dealer may "candle" foreign eggs and pass them off as new-laid British, thus lowering the public taste as well as cheating in price. Such doubtful characters tend to bring what is really a very honest and fair-dealing class of men into bad repute.

**The Small Producer.**—The small producer is, however, heavily handicapped when he tries to trade individually with the large salesman. Railway rates are a good deal against him, for, though they have been much reduced, they are still very much higher than those on the Continental State-owned railways. Many railways have special rates by which produce can be sent from any station on their line to London per passenger train, provided the produce is packed in suitable boxes which can be piled above one another in the vans. The Great Eastern charges 4d. for 20 pounds, and the Great Northern 6d. for the same, and this rate of carriage cannot be termed excessive. It is not, of course, comparable with the admirable system which enables the Surrey fowl to be collected, sent to London, and the empty package returned, at the rate of 1d. per bird, the light but strong "peds" which are used often filling two or three vans from floor to roof three times a week at Heathfield Station during the season. But these facilities have grown up out of the almost perfectly organized trade of the Surrey and Sussex fatters, and the small trader can hardly expect that equal privileges will be accorded to him. Then, again, the London salesman likes to have his birds sent in consignments of hundreds of couples, all properly graded and selected, and the little lots of odd dozens of fowls receive scant attention unless of outstanding value. The London market is a very varied one, consumers ranging from those who require a superlative article, and are willing to pay a good price for it, through the various grades till we reach the poorest class of customer who is able to purchase a fowl at all. All these different customers come to the Central Market or to Leadenhall expecting to find what they require, properly sorted and classified, and by means of the Surrey and Sussex fatteners' business methods they are enabled to find it. In all probability they would not do so otherwise, seeing that the depot movement is as yet only touching the fringe of the question.

**Requirements of the Best Markets.**—The London markets could be made even more important than they are with proper organization and a better system of distribution, but their main requirements are an improvement in the quantity, quality, regularity, and sorting of supplies. Birds of good breed are required in much larger quantities than they are at present produced, and *at the right season of the year*, whilst the consumer's taste must be studied.

It is useless for the producer to rail against the preference of the consumer for brown-shelled eggs and white-legged, white-fleshed birds ; it is for him to recognize the fact at once that, whilst yellow-legged fowls and white-shelled eggs can and will be sold for him if he sends them up to London, they will *not* receive top prices because they are not exactly what the best customers require.

As a matter of fact, the best method of marketing depends very much on the scale of business done. On a small farm where perhaps a hundred fowls together with a few ducks and turkeys are kept, and where no depot exists in the locality, it would be more profitable to work up a good private trade in the district, or to arrange a system of weekly hampers to private houses in large cities, than to send the produce up to Leadenhall, as in order to obtain the top market prices, when dealing with wholesale traders, it is absolutely necessary to observe certain conditions which the small producer can rarely fulfil.

**Some Marketing Points.**—Whether dealing with one or a hundred dozen birds, however, the margin of profit—never a very large one—is bound to be affected by the way in which the birds are despatched ; and it has to be remembered that fowls handled by the large salesmen, either in the Metropolis or in the big provincial towns, have to meet very stern competition, and in nine cases out of ten it is the appearance of the fowl that determines its sale, quite independently of its intrinsic value. No crates should be sent up which contain other than well-plucked, well-shaped, and well-packed birds, with empty vents, clean skins and legs, every fowl having been thoroughly well chilled and set before being packed in clean fresh straw. Finger-drawing is allowable in very hot weather, and a layer of crushed ice will help to keep the birds in sound condition.

"Ringing" and "topping" must be rigidly avoided, for, apart from the dishonesty of the proceeding, no experienced salesman will allow himself to be taken in, and would certainly not accept a consignment from an unknown customer without satisfying himself that *all* the birds were of sound quality. Honest dealing emphatically pays, and a steady custom is soon built up for the man who will trouble to study the requirements of the class of trade for which he is catering, and who sends regular consignments of good quality. Whenever direct sales can be effected, they should be taken advantage of, as even the saving of a fraction of the profits from eggs or birds is not to be despised. On railways where the organized system of crate collection and delivery is undertaken, the small producer in particular is advised to send his stuff in unreturnable packages. The use of boxes or crates of similar size and weight facilitates good handling on the journey, and is, in reality, cheaper in the long-run than the miscellaneous collection of crates, hampers, and cases so favoured by the average farmer.

In the matter of supplying the egg market, too, the small producer, unless he avails himself of the aid of a collecting depot, will be well advised to seek local trade and private custom, remembering that only three days' old eggs truly deserve the title of "new-laid"; that tinted shells obtain better prices than white ones; that the very large or very small eggs should be kept out, the most popular size being the one weighing rather over 2 ounces, or 16 pounds to the "long hundred"; that two or more breeds of fowls should be kept to maintain a regular supply of eggs; that from November to February eggs will fetch from 2d. to 3d. each retail, and that they are invariably scarce during those months, but that for a uniform weekly supply the whole year round a fair price retail would be 1½d. apiece. The weekly market system in vogue in so many parts of this country simply gives our egg trade into the hands of foreigners, since British eggs over a week old are older than French or Danish, and advancing toward the age of the Hungarian and Italian supplies. The small producer must therefore either work up a sufficiently lucrative private trade, or he must join the ranks of the up-to-date, and become a member of an egg and poultry society.

**The Formation of a Collecting Depot.**—Actual and definite information as to the best methods of forming such a society can be obtained from the secretary of the National Poultry Organization Society, but a few general remarks on the subject may not be out of place here.

The first step in the formation of a co-operative egg and poultry society is to ascertain whether there is a good local demand—as, for example, in the case of a garden village or the neighbourhood of a large city, where the demand often exceeds the supply; or whether better prices could be obtained by combination and the sending away of produce to a distant market. The local demand should always be supplied first, and secured against foreign competition; but if it seems insufficient, or if prices are too low owing to the presence of many producers, it is strongly advisable to organize for the purpose of maintaining a regular supply all the year round and keeping the prices at a uniform level—not so high as to restrict demand, and yet high enough to secure a good margin of profit.

The simplest form of society is an informal combination of poultry-keepers who agree to send all their eggs in to a common centre to be carefully tested, graded, and valued, and sold for the benefit of all the members. The committee would find out the ordinary local price, and value the supplies accordingly; but whenever a better market seems attainable elsewhere, efforts should be made to reach it. It would be necessary to teach members from the outset the importance of sending *all* their eggs in, and not merely the surplus ones of which they cannot dispose, or it will be impossible for the society to make good contracts. Eggs should be collected or brought in by the members thrice weekly, and should be of good size, perfectly fresh, and clean shelled. All bad, stale, or dirty eggs should be returned to the owners, and those which do not pass the test for "new-laids" should be sold unstamped as cookers, and not reckoned when profits are being divided at the end of the quarter. When a collecting depot is being established it is usual to supply each member with a numbered stamp, with which his eggs are marked, so that faulty eggs can be traced from the depot to their rightful source.

Those egg-collecting societies which have been formed (as is always the wisest plan) under the auspices, and abiding by the rules, of the National Poultry Organization Society, are entitled to use the Rose Brand stamp at their depots for eggs which have passed the necessary test, which is itself a guarantee of quality, but the stamp is only to be used by those depots whose managers have shown themselves capable of doing the work, and is not issued to new societies until the necessary experience in testing, grading,

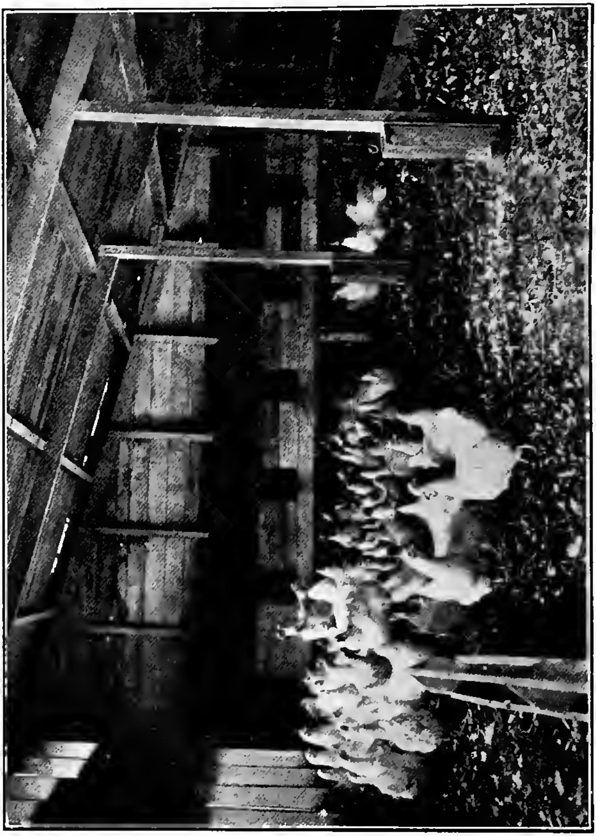


Fig. 48.—Interior of Large House at Mr. Toovey's Farm, King's Langley.

etc., has been gained. The Rose Brand stamp is not used by individuals, but only by the affiliated depots, and the trade-mark can be withdrawn by the N.P.O.S. on non-compliance with its rules.

Members of societies and managers of societies must always adhere strictly to the standard of egg excellence which the retailer and consumer require, and must remember that top prices which are to be obtained for first-quality eggs cannot be obtained and ought not to be expected for second or third rate eggs. A co-operative society works for the benefit of all its members, and each should do his best, not only to see that expenses are kept down, but that the *best quality only* is being produced, so that a reliable reputation for honest trading is attained by the particular depot of which he is a member.

The profits received by such a collecting society will go, as we have seen in the case of the Street depot, towards expenses of management, the provision of a reserve fund, a bonus in accordance with the number of eggs or birds supplied, and a small dividend on the capital employed. In a short time the simple operations of the egg-collecting club will probably be found inadequate, since in nearly every case it has been found, where such societies have been at work a little time, that the members are receiving prices 30 to 40 per cent. better than when trading individually. A wider area will have to be covered and operations extended, subcollecting depots and a central packing station being established. Table poultry will be the next section to be taken in hand, a fattening centre being found as a rule even more profitable than the egg collecting, provided a skilled operator is available for feeding, plucking, and shaping. Food appliances, etc., may be bought for sale to the members, and with the growth of the society other branches of business may be established, remembering that the greater the bulk of the trade done the smaller will be the expenses in proportion to the turnover. On the other hand, it is unwise to attempt too many branches of trade at first. Collecting the eggs is more costly than where members themselves bring their supplies to the depot, and should not be attempted unless the number of members is sufficient to justify it, or expense will mount up; but, on the other hand, it is for many reasons the superior method.

Eggs should be preserved at the depot during the spring months, as this can be done more suitably and profitably than by individual members.

As the club grows, if it has not already been definitely organized, it should be turned into a co-operative society, and registered (through the Agricultural Organization Society) under the Industrial and Provident Societies' Act of 1893, as explained in leaflet No. 97 on Farmers' Co-operative Societies, issued by the Board of Agriculture. The depots are, of course, controlled by their own members, but are governed by the rules of the National Poultry Organization Society, which requires that the methods of collection, grading, testing, and packing shall be on its own general system. The depots are all members of the Federation of Depots which markets the produce of the local societies to selected retailers in the London or large provincial markets within twenty-four hours, owing to the prompt business methods adopted. The National Poultry Organization Society can, of course, obtain the lowest rates from the railway companies, owing to the amount of traffic it controls.

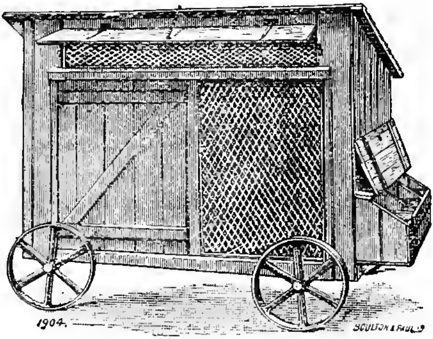


FIG. 49.—FOWL-HOUSE ON WHEELS.
(Boulton and Paul.)

Where these methods have been adopted, a surprising rise in quality has invariably been observed, and, indeed, if poultry-keepers generally would take a little more trouble over their methods of sale, a much greater proportion of home produce would be of first-grade quality since appearance has considerable value in this market, and misshapen shells, or those which are dirty or that have been washed and so lost their fine "bloom," or those in which evenness and smoothness of shell is lacking, are all brought down by one or other of these factors from a first to a second grade egg unsuitable for the best trade. When eggs for consumption are to be marketed on a large scale, it is far wiser, too, to make certain that they are infertile by keeping the laying flocks well away from male birds, as such eggs are so much less likely to deteriorate.

**Egg Preservation.**—The supply of eggs is usually very unequal—plentiful in spring and summer, but falling off during the autumn and winter, the latter period being contrary to the natural laying instinct; and whilst under domestication it is possible to increase considerably the winter output, there is room yet for a greatly increased supply. At the present time the essential conditions of winter management are not known and carried out as extensively as they might be; consequently the demand and value at one season of the year is very much greater than at another, and the opportunity ought not to be lost of disposal during the valuable season of the year of eggs which have been produced in times of superfluity. The more widely these methods are adopted, the more equal will prices tend to be, and the *average* prices obtainable annually should be better. Eggs which have been preserved should, of course, be sold strictly as such, and not at new-laid prices; but even sold as such, they fetch prices which, after allowing for expenses of preservation, show a good margin of profit, certainly better than if they had been sold at the very low summer prices prevailing in some districts.

**Water-Glass.**—Water-glass is the most effective liquid preservative, and is very extensively used, eggs keeping in excellent condition for fully six months if immersed in it. Sterile eggs are the most satisfactory for preservation, as they keep so much better; eggs which are more than three days old are not advisable, neither are those which are cracked or dirty in shell. The cost of preservation in water-glass has been estimated at about 1d. per 100 eggs, which is certainly not excessive. If preservation is being carried out on a small scale, it is necessary to observe that the eggs should be kept in a cool place not higher than

40° Fahr. in temperature, and that the water with which the water-glass is to be mixed (10 parts by weight of water to 1 of water-glass) should be previously boiled, the whole being mixed to as even a consistency as possible.

**Cold Storage.**—This method of preserving eggs is also in wide use, and is very effectual, provided the eggs can be used immediately when taken out of store, as they deteriorate more rapidly than when liquid preservatives are used. The process is too expensive also for any but large dealers.

**Sterilization.**—Sterilization by the "Universal" process is a comparatively new method, which has the advantages of being quick, effectual, and cheap, and the porosity of the shell is not affected, so that eggs preserved under this method are not apt to burst in cooking. Sterilized eggs retain the flavour of the fresh egg, and will keep quite well from three to six months, during which time they can be freely handled. The "Universal Sterilizer" is of simple construction, consisting of cases in which are rows of trays on which the eggs are placed, and fitted with air-tight doors, ventilators, etc., at top, and a vaporizer beneath which is a spirit lamp. Sterilizing tablets are resolved in the vaporizer by means of the lamp heat, and after they are evaporated the vapour passes into the air-tight case through a small opening provided for the purpose, permeating the eggs by means of their porous shells. It is impossible for putrefaction to take place after the half-hour's sterilizing which the egg receives, and there is the additional advantage attaching to this system that when the eggs are used the heat of cooking evaporates the preserving vapour, leaving the eggs in their original condition both in respect of appearance, taste, and nutritive value.

**Equipment of Egg and Poultry Depots.**—Although a young society is wise to go slowly and develop its business as it goes along, an inadequate plant means poorer returns, and is a bad investment for the money of the shareholders.

A suitable building must be found as near as possible to the station to facilitate carting and to economize labour, and it should be large enough to allow for the growth of the trade. There must be an office, a storeroom for egg-boxes, a packing room, and a testing room, which last must be cool, even in hot weather. If eggs are to be preserved in the spring months, a suitable place for storage has to be found, and this is best on the lines of an incubator room, wholly or partially underground, wooden structures being unsuitable for the purpose. Galvanized tanks are cheaper than cement ones, working out at about 6s. per 1,000 eggs ; but if a permanent building is being occupied from the beginning, the latter would be preferable. Tables for grading, testing, and packing will be needed, deep trays for holding the eggs, a good testing lamp, and the usual office requisites, whilst the account books, stationery, and stamps for marking are supplied by the N.P.O.S. The packing boxes which most depots have found the best are those provided with cardboard sections to save the trouble of counting, and with wood-wool as packing between each row. The regulation size is for three long hundreds (360), and for every 1,000 eggs despatched weekly it is well to have nine cases, in order that the late returning of empties may not delay the trade. The cost of these is about 6s., but, in addition, a number of cheaper boxes for the collection of eggs from the members will be required.

The National Poultry Organization Society reckons the cost of equipment of a depot whose maximum is 10,000 eggs per week at about £75, exclusive of building and of working capital, but inclusive of preservation tanks and fittings. For the working capital, if cash were paid to members as the goods were received, from £175 to £225 would be required ; but if the members were paid monthly £25 would suffice. Where a poultry depot is to be included as well as an egg depot, expenses would, of course, rise. If an existing building could be found to answer the purpose, £30 would be enough, including the cost of crates for sending to market ; but to put up a fattening shed for 500 birds with cages, food, stores mixers, and crammers, £60 to £80 would be required at the lowest, to which the cost of books and stationery would have to be added. If the birds were paid for as brought in, there would be about £75 required as working capital, in addition to which about £40 would have to be reckoned as food and wages bill, bringing the total up to about £150. Of course, where operations are begun on a smaller scale, much less capital would be required, and many societies work on very small capital by arranging for bank overdrafts as needed.

These figures are included by the kind permission of the

National Poultry Organization Society, but the full information as to the actual formation of egg and poultry societies, together with the full rules as to subscription of capital, general management, etc., are obtainable either from the offices of the National Poultry Organization Society, or from the Agricultural Organization Society at its offices in Dacre House, Dacre Street, Westminster.

In conclusion; we might state that the barest fringe of the great question has only been touched as yet, and that the best help the genuine utilitarian can give to his fellow poultry-keepers is the practical support of these methods and organizations. It would be well for our home trade could the principles of the National Poultry Organization Society be extended into every part of the kingdom, and the sooner we learn that union is strength and division of purpose the cause of failure, the more easily shall we be able to cast aside all fear of foreign competition, resting secure in the knowledge that the poultry production of this country stands upon a fair and stable base.

# CHAPTER X

## INTENSIVE POULTRY-KEEPING

American methods and English adaptations—The Philo system—The city system—Corning houses—Partial *v.* total confinement—The secret of success—Limitations of the system—Table eggs and table fowls—Breeding methods—The fireless brooder—Feeding of chickens and hens—The egg yield.

**Intensive Work in the Past.**—The intensive system is one of the most widely discussed problems of poultry-keeping at the present date, and so thorny and controversial a subject demands careful study and examination before the pronouncement of a definite opinion as to its merits and demerits.

To a certain extent, of course, intensive poultry-keeping—using the word to indicate the maintenance of a large head of poultry for economic purposes upon a limited area—has always been practised. But in the majority of cases the provision of a certain amount of land, which could be alternately cropped and stocked, has always been held to be absolutely necessary for the well-being of the birds, and the question of the removal of the accumulated manure before any ill-effects have been produced, or before the land has become too heavily charged, has invariably been found a difficult problem.

In order that the process should be quite successful, it has always been felt that a great deal of foresight and skill was necessary, that the number of fowls kept should be strictly regulated lest disease or reduced egg production should ensue, and that breeding from stock kept on those lines should be discouraged. From time to time experimentalists have tried the plan of keeping a large head of poultry upon a limited area in this country, and though good results have often been obtained for a surprisingly long period of time, the final result has invariably been disease and loss.

**Modern Theories.**—Our ideas on the subject of poultry-keeping on strictly intensive lines have, however, been considerably modified of late years owing to the introduction of American methods and theories, and the question which seems most important to us at the present time is the adaptation and suitability of these methods for the English poultry-keeper. It cannot be denied that we have to thank American poultrymen for many ideas of sound practical value, and that in many respects they are ahead of us in utility work. The American poultry-keeper is out for profit, and carries out his business upon as large a scale as he possibly can. The mammoth "egg farm" and "broiler-raising houses," the duck centres from which 40,000 birds are turned out in a batch, all appear strange to our ideas; but whilst many of them are ephemeral and transitory in character, there are many well-founded and really profitable establishments where the untravelled Englishman, who passes scorn on all commercial methods but his own, might learn, not merely a thing or two, but many things, with much profit to himself. It is foolish to condemn too hastily any innovation on time-worn methods, merely because it *is* new and startling to the conservative mind, until its merits have been investigated with some degree of thoroughness. Many of the details of poultry-keeping on modern lines, which are to-day accepted as a matter of course, roused a storm of opposition and ridicule at the time of their reception. At the same time it is not wise to rush blindly into any new system, American or otherwise, without making a careful study, not only of its intrinsic value, but of its suitability to English treatment.

Many of the alluring statements and figures published in the American journals are highly misleading, especially in view of the very different conditions prevailing in the two countries. Not that we have any desire to throw doubt upon the veracity of the American poultry-keeper, but some of the mass of advertisements relating to the variations of the intensive system are, though distinctly seductive, entirely without value from a practical point of view. In the vast majority of cases the wonderful incomes which are so rapidly made from the *utility* fowl—one fortunate individual whose "ad." lies before us is able to realize a profit of 50 to 100 dollars from each individual hen—must be considerably swollen by the profits on the dollar books which the thoughtful poultry farmer has compiled for the enlightenment of the puzzled seeker after truth. Even in the highly interesting and reasonable book of Mr. Philo, whose system has perhaps had more direct influence upon English intensive poultry-keeping than any other, we have found ourselves in direct disagreement with many of his figures, especially those relating to the ratio of expenses to profits, and we are of the opinion that, whilst a modification of the system is very well suited for certain purposes, and under certain conditions, yet the average English poultry-keeper will do well to make a very careful study of the subject from the English point of view before embarking on it to any large extent.

The Philo system claims to produce results which are not to be obtained by any other method, amongst these results being a vast increase of egg production, a reduction of food and labour bills by 50 per cent., and a consequent rise on the profits obtainable. We may compare the Philo plan—to be described presently—to the French intensive gardening, so much discussed a few years back. In both a heavy capital is invested in the production of extremely heavy crops upon a very small area of land, the amount of detail work required in both cases being very considerable.

At the Philo Institute, where rather over 5,000 birds are kept on half an acre of land, the birds are accommodated in small houses or coops, each holding six birds kept in total confinement. The ground is carefully laid out, and between the rows of houses fruit trees and sunflower plants are grown, the number of these small houses reaching about 840. We are quite unable to see, bearing in mind that these 840 coops are to be cleared and the earth spaded up every day, how such a system lessens the labour bill, nor, since the birds are kept in total confinement and are consequently unable to find any of their own food, how the food bill is to be brought down by 50 per cent. (provided, of course, that previous feeding of the birds has been conducted on common-sense lines), and these figures seem to us to be altogether wide of the mark.

The same experiment was tried in England on the Crystal Palace poultry plant of 1911 by one of our English intensive experts, and we were interested to find that, as a result of the experience gained thereat, Mr. Randolph Meech has given as his opinion that whereas the small coops are eminently suited for the needs of the backyarder or small poultry-keeper, in the case of extensive egg production upon intensive lines, the large houses, for layers in total confinement, built on the lines of those in use at the Corning Egg Farm of New Jersey—one of the largest in the world—are far superior.

Indeed, comparing the Philo system with the colony system, the feeding, housing, and labour expenses of such a plant appear extravagant to a degree, and where an abundance of land is forthcoming we cannot see that anything is gained by the adoption of the intensive methods, since the increase in the number of eggs obtained by the sheltered birds is balanced by the increased expenditure on their keep. We are inclined to think in this case that existing methods will be found less costly and to the full as efficacious.

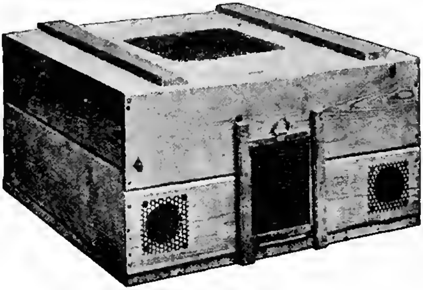


Fig. 50.—Fireless Brooder.
(R. Meech.)

**Advantages of the System.**—Where we think the advantages of the intensive system will be widely felt is in the case of the backyarder and those with small spaces at their disposal, whilst—given sufficient capital, of course—there is a great opening for the man who will cater largely for the market egg and the table chicken. We consider that the intensive system is a most effective method for the successful rearing of large numbers of table fowls, always provided that the cost of production can be kept sufficiently low. As its exponents claim, birds which are kept in such close confinement have no opportunities to run about and lose flesh; with good food and proper care they grow and fatten naturally, and the enforced inactivity renders the flesh the more delicate and tender. It is difficult to see how the necessary muscle and stamina required by the stock bird, or even the potential layer, can be obtained from fowls bred or reared on this system, but the production of a really excellent table fowl is another matter. We are accustomed to the fastening up of our table fowls in small coops for their final fattening period, but under the Philo system the birds have at no time more than one square foot of space in which to move about; the birds as they grow being simply shifted from the brooder-coop in which they spent their early days to the small house or developing coop. The proof that the system has a good deal of common sense to back it is the simple fact that "broilers" have been raised to a weight of 2 pounds apiece at the age of eight weeks in these small coops. It is facts like these which have caused experienced English poultry-keepers to make a thorough investigation of the system which has now passed through experimental stages in the U.S.A., and is becoming a commonplace of poultry-keeping life. In England, however, we are as yet beginners, and it behoves us to go slowly.

**The City System.**—It may be of interest to describe the working of the English adaptation which was shown at the Crystal Palace. This system is known as the "City intensive method," and, like the Philo, aims at keeping the birds in total confinement from chickenhood to the laying stage or until they are ready for killing.

The chickens begin their career in the "fireless brooder," which, like so many other inventions, originated across the Herring Pond, and which, dispensing with artificial heat, is so constructed that the chickens generate their own heat. Different varieties exist, but the best type is that in which simplicity of construction prevails, together with an ample ventilating system, the chief difficulty in their use arising, not from cold, but from damp.

The "City" fireless brooder is a square box containing a circular metal hover, well perforated for ventilation, and having a layer of roofing felt laid at the bottom to obviate damp, the nest above being made of dry hay worked into shape by the hands, the metal ring at the top to which muslin cloth is attached being fixed in position so that as the chicks enter the hovers the muslin touches their backs, Over the muslin an eiderdown quilt is laid, two being necessary if extremely cold weather is experienced.

In conjunction with the fireless brooder is used the brooding coop, the brooder being placed inside it at one end. One half of the coop is floored, and on this the brooder is placed, the other end being of dry soil, in which the grain is buried as soon as the chicks are old enough to scratch for their food. The earth has to be kept fresh by daily spading and occasional renewal. The coops are ingeniously contrived so that chicks cannot remain outside the brooder too long, thus contracting a chill—a point which has to be carefully watched during the early days of the chicks' lives. Another excellent device to overcome the same difficulty—*i.e.*, of the chickens getting chilled—consists in the addition of a small window in the coop opposite

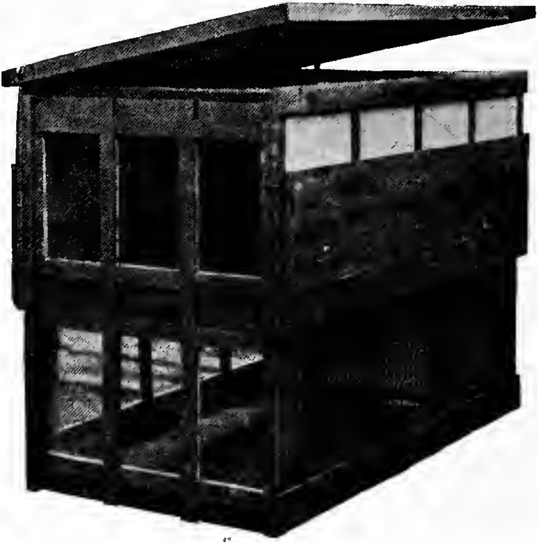


FIG. 51.—"CITY" LAYING HOUSE.
(R. Meech.)

the entrance from the run, so that the chickens can see their way in. The brooder-coop has a lid which is opened on fine days, so that the sun penetrates all corners and obviates any risk of damp.

At the age of three or four weeks the chicks are transferred to the developing coop, which holds them to the age for killing or laying. The construction is very similar to that of the brooder coops, only they are larger and have movable perches at one end. One of the drawbacks of this system is that the number of chickens has constantly to be thinned out as they grow and develop, and a good deal of shifting about seems necessary. From twenty-five to fifty chicks is the usual number to place in a fireless brooder, but it is obvious that at three or four weeks old, and again at eight or ten weeks, the number must be reduced by a half.

When the birds are matured, or when layers only are being bought and not reared, a laying house is the next requisite, modelled on the Philo lines—*i.e.*, holding half a dozen hens in total confinement, the floor space available for each being about 1½ square feet. The houses are double-walled round the roosting quarters, and have an adjustable muslin frame stretched across the top between the sliding roof and the birds' heads (the feeding and watering being done from the top), and nest-boxes, perches, and food troughs, are provided. We confess that it seems difficult to understand how better results can be obtained when each hen has but 1½ feet of space than on open range, since there is very little room for scratching exercise, which is none the less essential if the birds are to be kept healthy and productive. In this country the most frequent practiser of the intensive system has been the backyarder (and he more by necessity than from choice), but it has been accepted as a sound maxim that the more room the fowls have the better they do. Nevertheless, the intensive exponents maintain that if their methods are properly carried out, and the fowls correctly managed, better results are obtainable from an egg-producing point of view.

The success of the system of total confinement as opposed to fowls kept in a small run lies, probably, in the fact that the birds are kept perfectly dry overhead and underfoot, and that the ground on which the houses stand runs a much smaller risk of contamination owing to its dryness and the dryness of the litter covering the floor. Indeed, it is highly essential that all intensive houses be absolutely weatherproof (albeit there must be plenty of ventilation), or their usefulness is gone. We must admit that the intensive system does not allow of "coddling," all the coops and houses being built in a way that admits a maximum of air and sunlight, while they shield the fowls from cold and wet in an adequate manner. These small houses, however, require moving to a fresh plot of ground every three months or so where possible, to avoid the least risk of tainted ground.

**The Large Intensive Houses.**—Where a large number of birds are kept for the purpose of egg production, the small houses are not advisable, owing to the excessive amount of attention which would be required in order to keep them in good condition, and a large house, also to hold its occupants in total confinement, built on the lines which have been so successful in the States, is to be preferred. On the Corning Egg Farm of New Jersey, one of the largest "egg farms" in the world, as before mentioned, a very successful type of house has been evolved, the birds being moved into their permanent quarters just before they come on to lay. These houses are usually built on the double-decker system, one floor above the other, to economize space, the approach to the upper house being by means of outside steps at each end. The fronts are of wire netting, one panel of glass being fixed in the centre, the better to admit light when the canvas or muslin frames which are for use in cold weather are pulled down over the netting. In the warm weather these frames are slung back on the roof. The American houses have as little glass as possible, and they are rarely wider than 15 feet, so that all parts of the house are equally light and airy.

The Corning houses have an earth floor for the lower house, the earth being thoroughly well sifted and perfectly dry, and of such a depth that the grain can be well spaded in. In order to insure good drainage where an earth floor is used, it is customary to build the house on a sloping piece of ground, boarding the front of the house up to a height of 2 feet or so, and filling up the space with soil so that the back and front are level and a perfectly dry floor is secured.

**Wood or Earth Floors.**—A good deal of difference of opinion exists as to the advisability of the provision of wooden floors, and the majority of English intensive experts prefer the wooden ones, as they consider the likelihood of contamination and disease so much greater where only earth is used. We are hardly in a position to judge personally, as we have never kept fowls on the entirely intensive principle; but we remember one extremely snowy winter being obliged to confine a flock of layers in a large stone barn with a wooden floor for two months, the land being scarcely available for any of that period, and we had great difficulty in the maintenance of the wooden boards in good condition, even though we used sand and an ample supply of litter. It is, however, generally maintained that, where birds are kept in total confinement, the wooden floors are superior unless the houses on earth are shifted every two years or so.

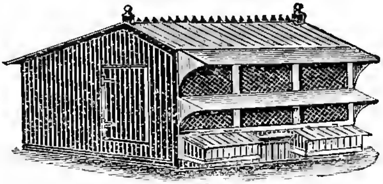


Fig. 52.—Binley Intensive House.
(A. E. W. Phipps.)

**Dropping-Boards.**—In the majority of large intensive houses the problem of the removal of the excrement is solved by the use of dropping-boards of great width below the perches, which are ranged along the back of the houses, the boards being thickly strewn with sand and scraped daily. Others condemn this practice as unhealthy, though we think that with care there is no reason why it *should* be so; but Mr. Toovey, of King's Langley, another of our English intensive experts, does not use them in his intensive houses, providing instead a thick layer of dry earth and road scrapings beneath the perches, and keeping this area quite separate from the "scratching" area of house by means of a board placed on edge between the two. In the small Philo houses the earth should be spaded daily in order to maintain them in a truly sanitary condition. A layer of sand placed on the wooden floors of the larger houses provides a sanitary base for the litter, and this last must be provided on a liberal scale, not less than three or four tons being necessary for a good-sized house, and the supply renewed twice a year. The straw is best thrown down in bundles for the hens to thrash out at their leisure. The roofs of the intensive houses must be good, and a drip-board provided to carry off all wet. Nest-boxes are fitted up in both stories of the "double-decker houses," and a raised bench, on which the grit-boxes, food troughs, water fountains, and bran hoppers, are placed.

**Partial or Total Confinement.**—A good deal of controversy rages over the question of the advisability of adopting the American system of total confinement. Many intensivists consider that the latter plan is the better, as they are of the opinion that the birds become unsettled and restless if allowed their liberty for some days and not for others; and where large flocks are run together it would be hardly possible for any saving in the food bill to be made, as the amount of natural food available would be infinitesimal among so many unless the run were extremely large. They further hold that risk of tainting would be much increased, and that egg production, so far from being increased, would be lessened.

On the other hand, and we are in agreement with this view, it may be argued that, while the direct benefits might not be very apparent, the indirect benefits to the health and activity of the fowls would be very great; and that, furthermore, the land would receive the direct benefit of the manure, so that if each laying house had a run of an acre or so attached to it, which could be divided and alternately cropped and stocked, the manurial benefit would be very great.

Certainly the labour bill is very much reduced when fowls are left in large lots in total confinement, as one man can look after and prepare the food of 2,000, or even 3,000, layers kept under these conditions, the birds all under one roof, their compartments easily reached, and the materials for feeding all at hand. The danger which exists where large numbers of fowls are run together—that of the spread of any disease which may get a foothold in a flock of birds—is always present under the intensive system, and the most scrupulous care must always be taken to maintain perfect cleanliness in bedding and feeding, together with an incessant watchfulness over each individual hen's health, bearing in mind the terrible loss which would inevitably follow upon the outbreak of any infectious disease.

**The Secret of Success.**—When birds are kept on the intensive system, the secret of success lies in the maintenance of no birds except those of the soundest constitution and most vigorous health; in the choice of a suitable breed and a well-regulated diet. A further condition of success lies in the *constant activity* of the inmates, who must be kept at work scratching for food, and it is highly important that all means be adopted which can further that end.

Except where chickens for table purposes are to be reared, the non-sitting breeds are advised, as not only are they more naturally energetic, but the danger of overfatness and consequent disease is considerably lessened. Of all the light breeds, we consider the Leghorn and the Campine to be the most generally useful. They eat less as a general rule than the heavy breeds—another advantage—and they mature and come into lay at an earlier age. Moreover, the heavy breeds kept under intensive conditions have an appalling tendency to go broody—far more frequently than where an open run is provided—and it cannot be too strongly emphasized that broodiness must never be tolerated for an instant on an intensive plant. The hens must be kept constantly at work, and the burying or spading in of grain, so that there is an absolute necessity for exertion, is a *sine qua non* if the system is to be a success. Good stock must be bought to commence with, which should be in hard, vigorous condition and fairly young, as if mature fowls are placed under intensive con-

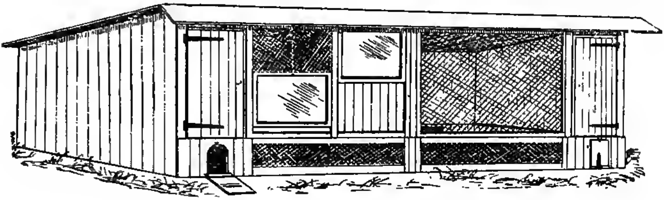


FIG. 53.—INTENSIVE HOUSE.
(Chipman's.)

ditions it may take them some time to grow accustomed to their surroundings. We are glad to see it generally recommended by our English authorities that the pullets used for intensive laying should be reared on open range, as we do not consider it possible that stock reared intensively can be compared for rugged health and stamina with those reared under natural surroundings. We consider that the continuous need for protection from weather, which alone enables the "intensive fowl" to fulfil its duties successfully, will become characteristic, and that it will be transmitted to the offspring. For the present, at any rate, so far as the production of fertile eggs goes, public opinion is for the open run, though we have no direct proof that both methods are not equally suitable under correct management. We do not mean that eggs cannot be successfully fertilized from stock kept on strictly intensive lines; many experiments have proved the average of fertility to be very good under these conditions. But we consider that there is bound to be a certain loss of stamina after a generation or two, and strong, vigorous birds alone are fitted to stand the close confinement and to fill the winter egg basket. Intensively-reared pullets are apt to mature too quickly, also, and seem to fail somewhat in their duties after a short season.

We consider that the intensive system has a big future before it within certain limits—*i.e.*, the production of eggs and chickens for table—but the stock for producing the eggs for hatching should, we consider, be obtained from fowls kept in small lots on free range, hatched and reared by hens and fed on plain food, so that laying is retarded until size and stamina is attained. The intensive system of rearing is an admirable one for producing soft juicy flesh, but we should hardly consider it likely to produce the necessary muscle and stamina required in breeding stock. At present we admit the question is more or less open, and we are aware that we are probably laying ourselves open to a storm of criticism on the part of the thoroughgoing intensivists, who maintain that there is no necessity whatever to restrict and limit the operations of the "intensive" fowl to the production of table commodities. We do, however, consider that, whilst a quiet ultra-domesticated race of fowls may and can be produced from intensive stock, yet the same fowls cannot compare so far as real vigour is concerned for *breeding purposes* with fowls reared on free range, and that the stamina of the progeny would inevitably be weakened after the first generation or so. The reason why chickens can be successfully reared is simply that they are watched and protected from the elements, and we consider that it is an impossibility that they should have the overflowing vitality of the naturally-reared chick. There is no doubt that more chickens could be reared per annum by the intensive method than by the natural plan, mainly because the rule of the survival of the fittest still holds good as regards chickens exposed to the elements; but we are inclined to think that the ultimate results of breeding from "intensive" fowls will be harmful to the feathered race.

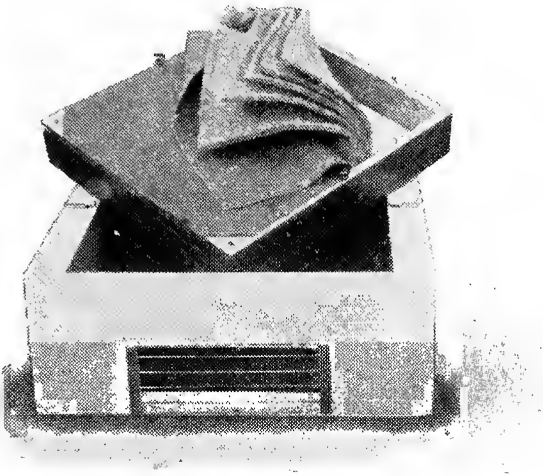


FIG. 54.—FIRELESS BROODER.
(Chipman's.)

**The Fireless Brooder.**—A good deal of hard hitting has been given and taken over this section of the intensive system, and it seems rather a pity that more moderation should not have been exercised, considering that we are as yet, in England, merely on the threshold of the study of the question. The "heart and soul" exponents of the cold brooder have been too anxious to condemn as cranks and faddists those who could not endorse the tenets of the system with their own fervour, while, on the other hand, a good deal of very unnecessary acrimony has been displayed by the upholders of the *ancien régime*, who have persistently refused to see any good whatever in the idea.

Until the system has been in working a year or two longer, it seems unwise either to rush wildly into print on the one hand or the other.

Certainly the system has its advantages, but with equal certainty it has its drawbacks, and the wise man is he who keeps the open mind until by personal investigation he has sounded the matter to his own satisfaction.

The difficulty in the past has been, not the keeping *warm* of the chickens, but the maintenance of *dryness* within the brooder; and the general consensus of opinion has been that in our moist climate an all-the-year-round use of the fireless brooder was not advisable, but that from March to October or November it was one of the most useful inventions of modern times—economical, since it requires no heating; satisfactory, since the chickens kept each other warm and got along extremely well; and convenient, because there was no danger from fire or from chill in the case of accidental oversight on the part of the person manipulating it.

During the months of winter, when our climate is not only cold but extremely damp—a difficulty the American does not have to reckon with, since dry cold is far easier to fight against than raw damp air—it can hardly be said with perfect disinterestedness that the fireless brooder can equal the hen or the heated brooder.

Granted that the months mentioned above are the "dead months"—*i.e.*, those in which hatching and rearing are admittedly unnatural—the fact remains that winter hatching has to be carried on to-day by both the utilitarian and the fancier; therefore the line of least resistance—which in this case we consider to be either the hen or the heated brooder—should be followed. There is no doubt that the chickens put into the fireless brooder during the winter months can and do keep each other warm, but the fact remains that, except in isolated cases, losses are much heavier than where heat is used, and the reason is simply that the moisture in the air, together with the moisture given off by the breath of the chickens, has made the air they are breathing within the brooder unfit for use. The fireless brooder of 1913 is, we admit, of vastly improved construction, because the principle of necessary ventilation has been more thoroughly grasped. In this the moist air is drawn out of the hover, and there is therefore the less necessity for the elaborate system of drying and airing quilts and coverings which was formerly essential; but even to-day there is a good deal to be learnt before the system can be pronounced perfect. Overheating should always be strictly guarded against, and if the chickens seem to be too warm their numbers must be reduced considerably. For the first few days after the chickens are put in they require a good deal of watching and education, till they learn not to stray away from the warm hover, and until they have learnt to enter when feeling chilled. The space in which they can wander needs careful regulation at first, and a little gentle training with a stick will soon be comprehended, the chickens learning where the comfort of the warm hover can be found. For food and exercise they should be taught to come out of the brooder into the brooder coop, and for the fireless brooders to give the best results they should, in our opinion, stand in dry, sheltered places, and only thoroughly healthy birds should be put in. Weakly chicks, if put in with others in the confined space available, would very quickly start disease and be a source of danger, so it is important that birds reared on these lines should be thoroughly sound and healthy.

**Feeding of Chickens.**—The feeding of the chickens in the fireless brooders does not differ very widely from that of chickens brought up in the ordinary way, but greater care has to be observed to keep them working if they are to be reared to maturity, and if for table purposes they must not be overforced, or the results will be disastrous. Most authorities recommend feeding every three hours, increasing the interval as the chickens grow. Two soft meals and two of grain will give bigger size and softer flesh than an all-grain diet where table birds are required, but for keeping the chickens active and employed an all-grain diet has distinct advantages, the grain being either buried in the earth run or among the litter on the boarded floor of the brooder coop. Any good dry chick feed of a reliable brand should be given, and for the first day it can be put on a clean board, till they can scratch. Meat is not advisable for intensively reared chickens, but many people obtain excellent results from the free use of milk. Green food is an absolute necessity, and should take the form of sprouted oats chopped very finely, and fed twice daily. The economy of sprouting oats is very great, since one peck of dry oats of good quality results in a bushel of spongy, easily-digested green food, admirably suited for intensive work, for which it is so largely used.

Water is another essential, and must always be before the birds, together with sharp flint grit and a hopper of dry bran. This last item comes as rather a shock to those of us who have always advocated the scalding of bran before feeding it to young birds, since it has been considered that, valuable as an aid to digestion as it undoubtedly is, this foodstuff was apt to cause bowel trouble if fed dry. Nevertheless, very satisfactory results have been obtained from its use in this way, and it is possible that, under the circumstances and given separately from the other foods, it does no harm. The dry bran appears to give no harmful results, except where it is mixed, in an unscalded condition, with the soft food which *has* been scalded. Where table fowls alone are being reared, suitable foods of a fattening character will have to be added to the menu, and the usual final week of preparation given.

**Table Chickens.**—There is no doubt that on this side of the business great advances are possible along intensive lines, and, given sufficient capital, it would be possible to turn out many thousands of chickens annually from a very small area of ground, provided the necessary reliable eggs were forthcoming and that houses suitable for the purpose were erected.

In intensive chicken-rearing labour is reduced to a minimum, and there are no losses from vermin, etc.; whilst if scrupulous cleanliness is observed, the risk of tainted ground can be reduced very greatly.

Provided the birds are kept perfectly dry overhead and underfoot, with the maximum amount of air and sunlight, the litter will keep sweet for a long period, and the valuable manure is all saved in good condition.

It is time for attention to be paid to the further development of the poultry trade, and the intensivist has his chance to make a good thing out of the increasing demand for young birds, for, with the choice of the many excellent and cheap foods now on the market, there is no reason why the cost of production should not be kept at a low figure.

Several enterprising utilitarians have adopted this plan, and are meeting with much success. Large cold brooder houses are used, accommodating 1,000 or 2,000 birds, and divided on each side of a central gangway into runs in which fifty birds are placed. The runs are deeply littered with straw and chaff, and adequate protection is made against the entrance of rain or wind, whilst excellent ventilation is provided. No outer run is provided, but a plentiful supply of green food is given, and the chickens are kept perfectly healthy and vigorous. Needless to say, the greatest watchfulness is exercised and the most perfect cleanliness observed.

**Feeding of Adults.**—The essential point in intensive egg production is to keep the layers hard at work scratching for their living, and never to allow them to put on flesh, which would not only lower the egg yield, but would tend to the unhealthiness of the stock. All food except the greenstuff and the one soft mash (which is not invariably supplied), is buried deeply in the litter or spaded well into the earth, and where it appears necessary to stimulate exertion it is generally found that a handful of millet-seed thrown down will keep the birds scratching all day for the coveted dainty. When soft food is fed, it is usually given at night and very sparingly, cooked cereals, with the addition of a little animal food (meat or cooked blood) or a small quantity of separated milk, giving very good results.

Clean drinking water must always be available, and the bran hoppers kept full of dry bran. Those who have tried hopper feeding extensively, prefer it to the use of the soft mash where the birds are sheltered from extremes of climate, as they maintain it is a return to the fowls' natural method of feeding—first a mouthful of bran, then a sip of water, then a hunt for scattered grain ; all this conducing to slow mastication, and being the natural way in which the fowl has to find its nourishment. Sprouted oats are an essential part of the intensive system, and are fed twice daily. Green food is, of course, quite essential for the maintenance of health under these conditions, and the feeding value of the oats is greatly increased by the chemical action of the sprouting.

**The Egg Yield.**—The great advantage of the intensive system is said to be the great increase in the egg yield, and those who have practised it extensively claim definitely that they obtain much better results from this method than from others. We consider that it is too early as yet to speak definitely, and are still inclined to think that small lots of ten or twelve, given free range and a good scratching shed, will prove the record-breakers ; but we do undoubtedly consider that, as a commercial venture, and with constant renewal of stock from outside sources, the intensive system may be made a most profitable undertaking, given a thorough understanding of the methods of working. For the town dweller and the backyarder we are inclined to think highly of it, whilst the Philo and City systems should certainly be the means of introducing the science of poultry-keeping among thousands of people who, owing to the limited space at their disposal, have hitherto deemed it impossible to produce their own " breakfast egg " or table chicken.

# MONTHLY NOTES FOR POULTRY-KEEPERS

## JANUARY.

Clean houses and fattening coops after the Christmas clearance ready for spring operations. Mix ½ pound soft soap and 1 pint paraffin with every 4 gallons limewash, and work into all the corners. Spray roosting houses with a 1 per cent. solution crude carbolic in water. Litter the floors well to provide additional warmth. Provide plenty of shelter against cold and wet. See that houses are weather-proof, and the scratching shed boarded up on the windward side. Fix a few perches up about 2 feet from the ground in the open run where the morning sun will fall. The fowls will sit there preening their feathers while the grass dries up.

Empty drinking vessels at night to save "thawing out," and do not permit fowls to drink water into which snow has fallen. On very cold days the chill may be taken off the water. Provide a dust bath in a dry corner, and do not forget sharp grit.

Give laying and breeding stock liberal rations, but do not overfeed. Collect eggs frequently to avoid frost, and release trap-nested hens as soon as possible.

The warm morning mash may consist of biscuit-meal alternated with barleymeal as foundation, mixed with sharps, bran, cooked vegetables, or steamed clover hay. Poultry spice may be given twice a week to layers, or mustard sprinkled over the mash. A little Douglas mixture in drinking water will ward off roup.

At midday give cooked meat (if this is unobtainable give steamed meatmeal in the morning mash) or fresh cut green bone. Hang a cabbage or turnip in the scratching shed for amusement.

Evening feed is grain, clipped oats, wheat, barley with maize and buckwheat as "extras."

In inclement weather give half the grain ration cold, the other heated (by pouring boiling water on, and allowing it to stand ten minutes). Last thing at night scatter grain in the scratching shed, so that the hens will work in the morning till time for the warm feed. Food troughs save waste, and are easily knocked up.

Incubators can be filled with eggs from December-mated birds for spring chickens. Good crosses for early work are Houdan-Buff Orpington, Faverolles-Buff (or White) Orpington, or Sussex (Light or Speckled)-Buff Orpington.

Do not leave the incubator drawer open too long when turning the eggs ; the loss of heat is not so quickly made up as under hens. Regulate the temperature of the incubator room carefully; unevenness of temperature is a frequent cause of dead-in-shell. Winter chicks when hatched require plenty of shelter, but no coddling. Brooders of the hot-water type are best for cold weather, as they retain the heat longer than hot-air machines. Lamps must be kept well trimmed and well timed.

Feed stock ducks liberally to obtain eggs the end of the month. These should be set at once, as early ducklings, like early chickens, fetch the big prices.

Breeding cocks should be liberally fed, and removed for a day's rest once a week.

If hens are sitting, do not allow many eggs ; eight chickens will be the most a hen can brood this weather. Make the nests in a quiet outhouse of damp earth, with hay as bedding. Feed the hen on maize once daily ; supply fresh water, grit, and a dust bath, and do not let her stay off too long.

Set some Faverolle-Dorking or white-legged Old English Game-Dorking eggs for the *petits poussins* market.

## FEBRUARY.

Begin hatching heavy breeds for November laying. Do not mate more than four hens with one cock, and pay special attention to his feeding. Introduce fresh blood every year, and mate cockerels with two-year-old hens.

"Sittings" will fetch good prices this month, also any spare "broodies." Put the freshest eggs in incubators, hens will take the others. Do not keep adding eggs when once the incubator is started, and only fill the drawer three-parts full; hatching results will be much better owing to extra oxygen available. Remember the importance of moisture, especially with duck eggs (which should also have a flannel wrung out in hot water placed on them on the twenty-sixth day). Test on the tenth day, and use "clears" as chicken food. Turn eggs in incubators twice a day until the nineteenth day, and cool from five to ten minutes.

Assisting hatching is seldom much good, and in the majority of cases the chicks are best left alone. Do not disturb hens while hatching, unless they are clumsy, or chicks may get squashed. The incubator chicks are best left in their drying-box for a few hours before being put in their brooder. Anti-vermin eggs should be placed in sitting-boxes.

See that each broody hen goes back on her own nest, hens' temperatures differing widely.

Scrub incubators out with hot water between each running. Push January-hatched chicks on with plenty of warmth and good feeding, keeping the brooder temperature even, and letting the heat down gradually. Ninety degrees Fahrenheit of heat the first week, 85 degrees the second, 80 degrees the third, and 70 degrees after, are good averages.

Do not overcrowd brooders, and move on to fresh grass or gravel daily. Feed on dry boards in the day nursery, and observe scrupulous cleanliness. A couple of soft feeds by lamplight will greatly benefit. Egg custard (made by beating up "clears" with milk, and letting it just set in a saucepan into which a piece of dripping is put) is a fine thing for the first week or two, then biscuit-meal alternately with dry feed. This should be bought in large quantities and stored. Give chopped onions or greenstuff daily, and a little cooked meat after four days. Milk is invaluable for making growth.

Each batch of chickens must have drinking fountains and food troughs.

Trim brooder lamp some time before shutting down for the night, so that any mishap can be rectified on the last round.

Boarded floors in coops and night nurseries must be well littered with chaff or wheat flights to avoid cramp. Put sacking over the runs in wet weather, so the chicks can run out.

Feed layers much as in January. Split peas or beans make a nice change at midday, and ½ ounce of hempseed per bird. Some boiled linseed is good in very severe weather.

If day-old chicks are to be sold in March, make arrangements for a constant supply of eggs (pure or cross-bred) from unlimited runs if the home supply is insufficient.

Popular breeds are the easiest to dispose of, also good table and laying crosses. Boxes for despatching the chicks should be bought now, and advertisements inserted in poultry papers the end of the month.

Wherever possible, use fresh ground for rearing; healthy birds cannot be reared on tainted ground.

If fresh land is not obtainable, it is usually wiser to keep chicken-hatching operations limited, and buy stock birds later in the year.

Coops, brooders, and roosting houses must be thoroughly well ventilated each day.

## MARCH.

Finish hatching heavy breeds, and put down eggs of light breeds for hatching in April.

*Petits poussins* will be saleable end of April and beginning of May, and should be specially fed on soft food, giving variety as far as possible, and aiming at delicate white flesh, with as little bone as possible. Biscuit-meal, ground oats, cooked foods, oatmeal, etc., should all be mixed with milk, and grit and greenstuff not forgotten.

Other chickens should have soft food alternated with dry, and bonemeal added to their menu. Chickens in brooders should have their dry feed scattered in chaff so that they have to work for it. Chicks need every care in boisterous weather, but coddling never pays, and delicate chickens will rarely pay for the trouble they cause. Newly-hatched chicks can be bought to make up bad hatches.

If buying sittings of eggs, rest them after their journey for twenty-four hours before setting, and have an understanding with the vendor about replacement of unfertiles.

This is often a hard month for breeding stock owing to high winds, and infertility may be expected unless plenty of shelter is provided.

When purchasing "broodies," examine carefully for cheesy growth in the mouth, or scaly leg, both being danger signs of infection.

Brooders must be kept perfectly clean and well ventilated, and never overcrowded, or diarrhœa may ensue.

January birds may be cold-brooded the end of the month if the weather is favourable, and gradually hardened off into chicken houses.

Ducklings for market must be pushed on rapidly and marketed at eight weeks. Those intended for stock must have access to swimming water after they are ten days old, and must be fed for bone and growth, not forced in any way.

House market ducks in roomy coops or sheds, with wooden floors littered with straw. Feed on barleymeal and biscuit-meal at first, later boiled rice and greaves to finish fattening. Do not give much exercise.

Keep chickens dry, and place the coops or rearers so that they are able to obtain as much sunshine as possible. Many a failing clutch of chickens has been revived by being placed on freshly-dug soil—so much depends on their having fresh land, and it is easy to place them on the land before planting vegetables, for example.

Sow mustard, cress, and rape in shallow boxes covered with fine meshed wire, and they will enjoy the green feed. Nettles and dandelions should be cultivated in all hen runs; they have valuable cooling properties. Do not forget greenstuff for layers this month.

Their morning mash may be of middlings and bran plus bean-meal or swede turnips boiled soft. Biscuit-meal on alternate mornings, and wheat and barley at night. A little ovary tonic should be given in the drinking water. Stock cockerels may have a weekly dose of Parrish's Chemical Food.

Orders will be coming in for day-old chickens and ducklings, and must be filled in rotation. They should be sent as soon as dry and strong on their feet, packed in dozens, with soft hay round them, in the special boxes made for this trade, well labelled, and sent by a quick train, the purchaser being advised of their despatch. They need no food before starting, but when arrived at their destination may have a warm feed of biscuit-meal, and be brooded as soon as possible.

## APRIL.

Incubation will still be in full swing, as the light breeds will have to be hatched for autumn laying. Anconas, Campines, La Bresse, Leghorns, and Hamburghs, should be hatched this month and the next. Ranges of sitting-boxes may be placed out of doors now.

Eggs of geese and turkeys may be set early this month. Young turkeys when hatched require food in little quantities, but often. Biscuit-meal, finely chopped hard-boiled egg, finely chopped onions, and later on Sussex ground oats, should be supplied to them, with a daily quantity of green food.

Indian Runner duck eggs may now also be set.

Chickens hatched early in the year may be cold-brooded now. As incubators and rearers go out of use, they should be carefully overhauled and cleaned before storing. Hot-water tanks should be scrubbed and thoroughly dried, lamps emptied, thermometers put safely away, and flues cleared. Particular attention must be paid to disinfection and the destruction of insect pests in rearers.

All growing stock needs close attention, and as the weather gets warmer insect pests make their appearance. Any drooping chickens should be examined carefully, and insect-powder used freely under the feathers. If no insect pests are found, try constant change of ground (taking care to keep grass short round the coops, etc., or the chicks will get too soaked) and untainted soil; the young birds will soon pick up again under this treatment.

To preserve grass runs lay hurdles or bundles of pea-sticks over a small portion. Leave for a week, then take up the hurdles where new grass will have sprung up, which will be greatly relished by the fowls. Shift the hurdles along to rest another portion.

Chickens for sale to fatteners must be separated from those intended for stock, and fed liberally on fattening foods.

Incubators and rearers need careful adjustment to the outside temperature, which has a considerable effect on them.

Spring cleaning can be continued, houses and nest-boxes whitewashed, and new perches fixed in movable sockets, the ends being previously soaked in paraffin to keep off red mite.

Turkeys and ducklings must not get wet until their first feathers have grown, and it is best at first to keep the hen cooped, then they can run under her.

Those ducklings weighing over 3 pounds should be marketed, and none kept over twelve weeks, or they will go back while feathering.

Fat old hens can be sold at greater profit now than in August, as there is a good demand, owing to Jewish festivals.

Give laying stock soft food three mornings a week, on the other mornings wheat or oats. Greenstuff at midday with a little green bone and oats, wheat or buckwheat at night.

If thin-shelled eggs appear, limit the dietary and knock off soft food, giving plenty of oats.

Farmers' birds may go on an all-grain diet at the end of April; if on pasture land, twenty to thirty to the acre is enough.

Continue to send off day-old chicks. Light breeds should sell to the end of May.

Having made arrangements with hotels, restaurants, or clubs as to quantity to be sent, *petit poussins* should be killed the last week of April, plucked carefully to avoid tearing the delicate flesh, packed (when perfectly cold) tightly together to avoid damage, with plenty of white paper round each bird.

If obliged to run chickens with hens, a little shelter should be made by hammering a few rows of stakes in the ground at one end. They should be close enough together in zigzag manner, so that the hens cannot get through. The little ones will be able to run about in peace.

## MAY.

Quickly maturing crosses, such as Ancona-Orpington, Ancona-Wyandotte, Faverolles-Leghorn, may be hatched with advantage. Table crosses, as Faverolles-Orpington or Houdan-Orpington, if hatched the end of the month, should make splendid Christmas birds.

Breeding pens of the winter should be broken up, the sexes widely separated, and placed on fresh ground to recover condition. Stock cocks not required for next season should be sold. Stock hens should have a rest; if determinedly broody, may sit on dummy eggs for three weeks to tone up the system in readiness for next season's work. Continuous layers who go broody now may also be rested; others, however, should be broken off by penning in broody coops, where they can only perch, and feeding sparingly, but allowing fresh water.

Feed laying stock more scantily, and do not force egg production in unprofitable months. It is well, however, to remember that spring and summer eggs help to pay the chicks' food bill, and that seaside and holiday resorts are large consumers in these months. Surplus eggs should be preserved in water-glass ready for the winter. They should be put down when quite fresh, unfertile if possible, and the shells should be clean and uncracked.

Farmers' birds can manage now with one meal a day of grain, as they have so much natural food.

Where hay is cropped, pens should be emptied that the grass may grow. Land which has been in use some time should be rested; try, however, to have the youngest chicks near at hand under observation, and protected from birds of prey and vermin.

Chicks should be getting along well now with warmer weather, and close watch should be kept for insect pests; and as the sun gets more powerful, provide plenty of shelter with hurdles if there are no shady trees in the run.

January chicks may now sleep in open-fronted houses, and those over sixteen weeks should perch a foot from the ground on broad, flat perches; if this is delayed too long the birds will hang fire. Wasters should be sorted out and fattened (either at home or sold to fatteners, who will give good prices early in the season). Spring chickens should be plump, and have nicely distributed fat flesh, and should fetch good prices this month and next.

The future stock birds must be well sorted out and the sexes separated. Never overcrowd, and never allow different ages and sizes to run together, or the youngest will get pushed aside. Change quarters as often as possible; youngsters are apt to become stale, so every effort must be made to keep them hungry and working. Keep water vessels scrupulously clean and out of the sun, replenish frequently, and add a few crystals potassium permanganate (only enough to just tinge the water). Any cases of diarrhœa must have boiled rice over which powdered chalk or ginger has been sprinkled.

Chickens allowed plenty of onions and garlic will be less liable to suffer from gapes. If any cases occur, use powdered chalk and 5 grains camphor mixed as a spray.

Turkeys and geese hatched now fetch good Christmas prices. From the second week young turkeys may have a little crushed corn in addition to their soft food.

Let a gallon of oats stand in hot water for twenty-four hours. Spread in a shallow box, cover with sacking, damp daily till it sprouts, when the hens will enjoy it.

## JUNE.

If any breeding pens remain, break them up finally, and sell the cocks as soon as in condition. Commence marketing old hens to make more room. This is a good month for making adult purchases, as so many breeders will be clearing out their stock. Care must be exercised in buying, however, especially when laying qualities are in question, as a reckless purchase may undo the work of years.

Weeding out of chickens may still go on, and a rigorous thinning usually proves the best policy in the end, as the food bill is reduced, a little cash is realized, and there is now room for the fine specimens.

Place the coops, etc., so that the morning sun falls on them, and then turn round so that they are shaded from the midday heats. Early feeding and release from sleeping quarters is essential.

As soon as the hay is carried, chickens and colony houses should be shifted to the clean, fresh ground available, and should thrive well on the great variety of natural food in a fresh-cut field.

All houses should be open-fronted if possible, and if any shutters exist they should be removed.

Do not let the chickens be brooded too long, as prolonged brooding causes the hatching of so many insect pests. Keep the chickens busy, scattering grain as widely as possible, and do not give too many meals this month. If the youngsters get " off their feed," reduce their quantity of mash, give boiled nettle leaves to tone up the system, and keep them on a low-grain ration. Ducklings cannot stand hot sun, and must be carefully shaded. It is a mistake to hatch ducklings in very hot weather. Where more duck eggs are required, the stock ducks must have plenty of meat in their food.

Feed laying hens sparingly. Eggs are not required now as they are in the autumn, and it will not do to use the birds' strength. Economy in food is all right now (up to a certain point), whereas it is very bad management in October.

Do not force the pullets too much, as immature layers are not wanted, especially in the case of the heavy breeds. If any case of leg weakness appear, give Parrish's Food and bonemeal.

Do not neglect separation of the sexes, and beware of overfeeding light breeds, or they will lay too early, go into moult, and be unprofitable. Green food must be liberally supplied this month, and cress in shallow boxes when growing is eagerly relished, also lettuces that are running to seed.

Breeding and laying stock need not have a soft mash in the mornings, but clipped oats or wheat, giving the alternate grain at night, and a few peas at midday with greenstuff.

Preparations should now be made for hurrying up the moult, so as to get it through while the weather is mild and the hens ready to start winter laying. This can be done by penning the birds in sheds which get all the sun, by keeping on low diet till laying is stopped, and after that a generous one of soft food, soft green vegetables, and boiled linseed or hempseed in the soft food.

June is a good month for tarring, whitewashing, and general repairs. Store incubators and rearers. Tarring is best done in hot weather, the tar sinking into the hot dry wood.

Keep down red mite in the roosting-houses by means of paraffin emulsion wash.

## JULY.

Clearance of old stock must be completed, also the weeding out of chickens. Every precaution must be taken against overcrowding, and future breeding stock must have plenty of room for development.

In pens where the grass is burnt up, extra quantities of greenstuff must be supplied, and in very dry weather the garden-hose can be applied with advantage on the pens which suffer most. When the hay is in, young birds may be turned into the meadow, using colony houses on wheels, which may be placed in the shade of trees or hedges. The soil is looser in the hedgerows for scratching, and there is more insect life, but grit must be supplied in addition.

If many old hens are to be sold next month, efforts must be made to obtain as many eggs as possible, any signs of moulting checked, and a liberal diet supplied, together with an ovary tonic. Do not give extra rations too suddenly, or this may cause moulting, but work up gradually to the maximum amount of possible daily food.

Not only will extra eggs be obtained, but the fowls will be in better condition for marketing.

Stock which is to be retained should, however, be encouraged to moult, and preparations should be made accordingly. The birds should be kept in semi-confinement in a hot pen where all the sun falls. Low diet at first—grain only—with Epsom salts (previously dissolved in hot water) added to the drinking water. When loose feathers are noticed about, and egg production is finally checked, they can gradually be brought back to liberal diet, and must have every care, as moulting involves a heavy strain on the system, and appetizing food must be supplied, together with a good tonic.

In the morning mash (of biscuit-meal, sharps, bran, and oatmeal) stewed linseed should be given twice a week. Midday, a small handful of grain or peas; and at night a good feed of wheat or clipped oats, with buckwheat for a change.

Regard cut bone and meat with caution during hot weather, as, if tainted, ptomaine poisoning may be caused. Permanganate of potash in the drinking water is an additional safeguard.

Provide plenty of shade, for growing chickens and ducklings need special protection against hot sun, any temporary structure that can be rigged up being suitable.

Turkey chickens will be just "shooting the red," and need special care: protection from wet, cooked meat with their food, and a little tonic. This period over, however, they will give little trouble if they have a wide range.

Pullets for table purposes should not be run with those intended for laying or breeding, as the diet should be different. Laying stock must on no account be forced, and where pullets are reared with any degree of freedom they may be fed from three months old on grain alone, until it is time for them to start laying, when soft food can be given.

Garden refuse should now be plentiful, and is always much appreciated.

A pen that has become much tainted should be thoroughly well dug over and planted with mustard, which, in addition to purifying the soil, will afford green food for the birds.

Very old hens that can hardly be sold in the market may be killed for home use, hung well, then boiled slowly for three hours; they will then do quite well.

## AUGUST.

While the weather holds good, any building and repairing that has to be done for the next winter's work should be carried out and all plans settled. Tarring can also be done, and any fencing or gate-mending or netting that seems requisite. Stores can be overhauled, and all apparatus mended and painted.

Creosote is cheaper than paint, and as good a preservative, though not so sightly. It should be applied hot, and allowed to sink well in.

Farmers have the advantage of their stubble fields—wheat, barley, or oats—on which the birds can be placed as soon as each is available, and in this way food bills can be kept down during August and September. In many cases farmers will permit poultry-keepers to run their fowls on the stubble for a small consideration in money or kind. Turkeys and geese may be turned out, too. If neither of these are kept, let the biggest chickens have the benefit of the land.

If there is any trace of leg weakness in the most forward chickens, it will be showing now, and should be checked by the administration of Parrish's Food, and plenty of greenstuff, bonemeal, and oats. Do not allow any fattening foods to be given unless it is a bad case, when the bird should be made up for market, and not kept to maturity.

Incubation should begin again the end of this month ready for Christmas trade, Christmas chickens being required of larger size and greater weight than spring chickens. Hens are better than incubators at this season, and if incubators are to be used, great care in regulating the temperature must be exercised. An underground cellar is for the same reason to be preferred to an outside shed or room (unless that is built of stone), owing to the difficulty of regulating the temperature in a building exposed to sun-heat.

If any batches of chickens have not been sorted out yet, the sexes should be, without further delay, separated, and the pullets kept out of sight and hearing of the cockerels.

Pullets that have any appearance of laying should be checked by constant removal to fresh ground and surroundings, and by a limitation in the quantity of food, keeping them strictly to grain for at least a month. Eggs are not wanted before the end of October, and though many light breeds, such as Ancona, will lay at five months if well fed, this is not a good thing. In the first place, because it stops growth and development; and, secondly, because, after laying a few small eggs, the bird will go into moult, and perhaps waste the whole season.

All fowls at this season are very liable to be infested with insects. A sharp watch should be kept, and frequent dustings of pyrethrum powder given. Nest-boxes should also receive frequent dustings.

Turkey poults must not be neglected, since even feeding and steady growth is what makes a good market bird. A good soft feed mixture is sharps, ground oats, barleymeal, and boiled potatoes.

Stock ducks will be moulting, and should have a generous diet of bran, sharps, and rice boiled in the morning, and grain at night. Avoid all fattening foods. Let them have a good grass run.

Young goslings need plenty of water and grit, and plenty of bedding—straw or hay.

## SEPTEMBER.

Bring March pullets along for autumn laying with nourishing food and plenty of exercise.

It is best that pullets should not lay before six months, so that they may be well matured; and the younger chickens should be retarded, if they show signs of laying, by moving them about and keeping on a grain diet.

If eggs for table purposes only are to be produced, no cock will be needed, of course; but where any cock has to be purchased, the choice should not be delayed long.

As combs redden up, watch that pullets do not begin by laying away from proper nest-boxes.

Shut June chickens up for fattening for seaside resorts, etc. Keep young turkeys off wet grass and shut up early. Feed stock ducks and hens liberally for the maintenance of condition, but do not permit them to get fat.

Michaelmas geese take about three weeks' preparation. Keep in clean, small yards with plenty of straw bedding, and feed on barleymeal and cooked potatoes mixed with milk, dried off with sharps and bran. Maizemeal is apt to give the skin a yellow tinge. The mash may be boiled with meat liquor instead of milk, and some melted fat should be given. Oats form the best night feed. Do not kill off two or three at a time, or the others will pine. Christmas geese must be of a larger size, and may be turned on to stubbles or into turnip fields with advantage.

Clean pens at the end of September, removing feathers and manure, noting that fowl manure is more valuable after moulting-time than at others, owing to the manurial value of the rotting feathers themselves.

Discontinue summer foods and rearrange the diet for egg production.

Pullets should form at least 70 per cent. of the stock for winter months. When preparing for autumn mating, study carefully the proportion of hens to cocks, too few or too many being equally detrimental. Roughly speaking, allow five to seven hens of the heavy breeds, and eight to ten of the light, to each cock; but if he is an old bird, reduce the hens by two in each case.

Only mate healthy, well-matured stock having straight breast-bones, and as a rule two-year-old hens and year-old cocks give best results.

Birds hatched this month and next will suit the Christmas trade, when there is such a demand for heavy white-fleshed fowls.

Greater care in rearing is necessary in autumn owing to worse climatic conditions, but given suitable appliances, soil not too heavy, and situation not too exposed, good profit can be made. Hens should be employed for hatching when possible; brooders, of course, for rearing.

Autumn-hatched birds also come in usefully as layers when those which have laid right through the winter are ceasing, or going broody.

Where birds are kept in confinement, it is best to have two runs, and put the birds on each for twelve months alternately, cropping the alternate run each year. Fowl manure is such a fine fertilizer that very heavy crops can be grown on land which has been stocked for six or twelve months; and by this system the birds do well, as the fresh ground is good for their health, whilst the organic matter from the decaying roots is a breeding-ground for earth-worms, so useful a food for laying hens.

At the end of the month accounts should be made up, as October is a good time to start the financial year.

Houses on wheels are most suitable for the stubble land.

## OCTOBER.

Ventilate roosting houses well. Roup easily develops from colds brought on by the sudden change from an over-heated house to the exposed run. Open-fronted houses are best.

Draughts must be avoided, but there should be an air-space of several inches running from front to back right under the roof, giving a current of air well over the heads of the fowls. Houses must be snug and water-tight for the winter, and any holes stopped up with pitch.

Prepare scratching sheds for use, and obtain a good supply of litter—straw or dead leaves—and granulated peat moss for the roosting houses under perches.

Appliances that are well painted and tarred last much longer. Enclosed runs of earth or gravel may need attention, and a load of fresh soil or of gravel should be put down before the land gets sodden.

Place colony houses in as sheltered, well-drained, and accessible situations as possible, both for the sake of the birds and their attendants. Movable houses should always have good wide wheels with broad rims for field work, and those built in sections are the most convenient.

Where autumn chickens are reared, keep the grass closely cropped round the brooders to avoid chills.

If coops are used, a covered run must be attached, and the chicks kept in till the wet has dried off the grass somewhat. Visit brooders late at night, and note if the chicks are huddling together. If so, the temperature must be raised, as the nights will be getting colder.

Give layers an extra allowance of meat—1 to 1½ ounces per bird daily. Give soft food as early as possible, and ring the changes as often as possible on biscuit-meal, granulated meat, sharps, bran, table scraps, rice, barleymeal, etc. A little poultry spice may be added twice a week.

At midday bury grain in the scratching shed; at night, alternately, wheat, barley, or oats. A little maize on cold nights.

Pullets just coming on to lay must have a liberal supply of food, which can be reduced when in full lay. Those which look like laying but seem to "hang fire" can have extra meat rations for a few days.

Supply greenstuff where grass is not obtainable.

All birds should occupy their winter-quarters now. Do not shift about or make alterations in stock—layers are extraordinarily sensitive to changes. Twenty-five is the largest number to run and house together, and, on the whole, small flocks give better averages than large.

To obtain winter eggs, pullets and hens must have been bred from strains in which several generations of winter layers can be traced, the pullets being hatched neither too late nor too early, the hens not more than two years old, the housing comfortable, and the food able to supply egg material and restore waste. Exercise must be constantly encouraged by work in the scratching shed, and no moping allowed.

Stock ducks for January breeding should be settled down in good, nourished, store condition (not too fat). Fertile eggs in December and January are largely a matter of management. Do not mate too many ducks with one drake, or fertility suffers.

Pen Christmas turkeys and geese about the 15th of the month, and feed liberally.

Fourteen-week-old chickens fetch excellent prices from fatteners in January; some should be hatched in October, and pushed on as rapidly as possible.

## NOVEMBER.

Layers should be doing well and be kept moving, with plenty of range and nourishing food, but not forced with condiments, or there will be bad results in the breeding season. House scraps (not much bread or potato) should be all utilized, boiled up with the morning mash. Give soft food in troughs to avoid waste, and the last meal of the day as near dusk as possible. Late birds may have three meals a day—two soft, one of grain.

Make snow blinds out of old sacks opened up and nailed outside the netting of covered runs, preventing drifting and keeping the floor dry.

Any eggs under hens should be covered with flannel while the hens feed, as frost may spoil the germ.

Table birds for Christmas must be pushed along, though, as the demand for fat capons will last for two months beyond, only the most forward should be penned. Give little exercise, warm housing, and food of not too fattening a nature ready for their final three weeks' penning.

Feed twice a day on soft food (barleymeal and milk, ground oats and warm water, rice boiled with milk—any of these dried down with middlings). At night give corn up to the end of November. Any quarrelsome cockerels and "wasters" should be killed and eaten at once. It is waste of food fattening them, as the former unsettle others, and the wasters may contract disease. Keep them quiet and restful, and give their meals with the utmost regularity.

Three ducks are enough for each drake this month, and the stock must be unrelated, thoroughly healthy, and mature. If confined in runs, give two meals daily, one warm (barleymeal, middlings, pea or bean meal, and house scraps well boiled). At night, either another mash or a feed of wheat or oats. Give plenty of meat, grit, and green vegetables; fish-heads well boiled, with the bones powdered, make excellent food when eggs are not being sold for table purposes. Scalded clover hay promotes fertility.

Give surplus milk to the turkeys in their mash of barleymeal, ground oats, potatoes, and middlings.

When birds are first penned for fattening, fast them for a day, when they will settle down comfortably.

Treat Christmas ducks, turkeys, and geese like fowls—*i.e.*, limit exercise, feed liberally, but do not force till the final three weeks.

Do not allow laying ducks to enter swimming water till about ten or eleven o'clock (by which time they will probably have laid for the day), or the eggs will be lost in the water.

Sheds for ducks and geese should be of stout material, with well littered floors and plenty of ventilation.

Geese should be penned this month, and fed on ground oats, barleymeal, and middlings mixed with prepared fat. Feed at daylight, 12.30 and 3.30, and put their last feed (of grain) into their drinking troughs; they will eat much more out of the water. Give sharp grit and water before breakfast and at night.

If chickens are wanted the first week in January, the breeding pens ought to be mated up about the 20th.

This is a trying month for colds, etc. Keep a sharp watch for any suspicious symptoms, and promptly isolate and treat any bird that sneezes, coughs, or runs at the eyes or nostrils.

Egg yield will depend a good deal on climatic conditions, but these can be counteracted considerably by common-sense feeding, plenty of meat and vegetables, and by the provision of plenty of shelter from the winds. Collect eggs frequently, lest frost should reach them.

## DECEMBER.

A good cooker saves time during the winter. The warm mash can be prepared the previous evening, and left to simmer all night, and is hot as early the next morning as required. Do not make soft food too moist. Barleymeal and mangolds are two valuable winter foods. Do not give bran unscalded when mixed with other soft food, for fear of bowel trouble. Poultry powder may be supplied twice a week. Give a slight midday meal, but a generous feed of grain before dusk, so that the birds go to roost with full crops. See that all are comfortably perched for the night, and that no snow is drifting in through ventilators, etc., on them. Encourage laying by warm housing and generous feeding. Boiled maize should be given on frosty evenings. Leave the door into the scratching shed open, so that the hens can go straight in as they come off their perches, and work away among the litter till the warm mash arrives.

Rough sheds, hurdles, or felting stretched on a framework of wood, will provide shelter against wind or rain.

Ducklings hatched in January fetch the best prices of the year, so every effort should be made to induce fertility, and every available fertile duck egg should be sold for incubation or hatched at home.

Hatch some chickens of the heavy breeds; they will come on to lay in August or September, filling the gap while the spring-hatched birds come on to lay, and the old birds moult. They may not lay through the winter, but may moult and come on again when the March-hatched birds are resting, or if preferred, can be fattened in autumn and sold as young fowls.

Incubation for the spring-chicken trade will be in progress at the end of the month, and as weather conditions are so trying, every possible care and attention to detail must be given. Where hens are used, only give a few eggs, as six or seven chickens will be much more easily reared than a larger quantity. Early chicks should be fed every two hours, one or two meals being given by lamplight at night, and plenty of warmed milk supplied.

Chicken coops should be placed in sheds or in the shelter of haystacks, where the youngsters can run in and out, and yet be sheltered from wind. Rearing must not be overdone this weather; a few well cared for will give better results than a large number. The stock from which winter chickens are bred must be strong, vigorous, and well matured.

Birds hatched too late for Christmas markets should be held over till the end of January, when supplies are usually short.

Christmas marketing is *the* business of the month. An agreement with private customers or salesmen should be made early in the month. They will usually fix the day for delivery, and killing must be timed accordingly.

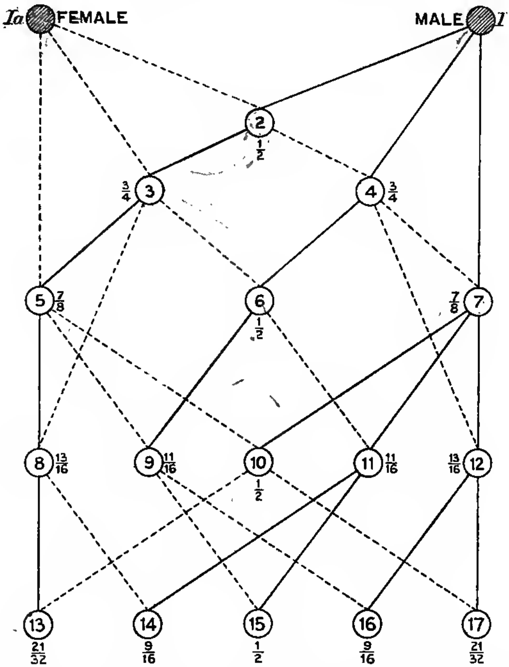
Put all Christmas stock into fattening coops, and feed three times a day on Sussex ground oats moistened with skim milk, giving each meal in three or four small helpings. Keep in darkness between meals, and keep troughs sweet. For the last ten days add shredded fat to the food.

Before killing, starve for twenty-four hours, and kill by dislocation of the neck. Pluck immediately. Keep the head down, so that the blood drains away, leaving the flesh white. See that the feet are clean, and empty the vent. Tie fowls down or shape in troughs. Do not break the breast-bone. All birds must be thoroughly chilled before packing in plenty of clean straw, and packed tightly to avoid bruising.

# APPENDIX A

## LINE BREEDING

**Felch's Chart.***—This chart shows how a large number of birds of three distinct strains can be produced from a single pair of fowls, the progeny having the size, vigour, and colour of the original pair. The dotted lines indicate the female



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* Reproduced from the *Poultry World Annual* of 1910, by permission of the *Poultry World*, 154, Fleet Street, E.C.

parentage and the full lines the male parentage; the circles represent the progeny. The numbers against each circle indicate the proportion of blood of the original sire and dam (I and I*a*). Thus, circle 10 represents a mating of circles 7 and 5, the pullet 5 possessing ⅞ the blood of the original dam I*a*, and the cockerel 7 having ⅞ the blood of the original sire I. The progeny therefore contains ½ the blood of the original mating, I and I*a*. In circles 2, 6, and 10 we have birds equal to the first mating showing the possibility of breeding for an unlimited period without going outside the owner's strain for fresh blood. The circles 5, 8, 13, etc., show the female strain; the circles 7, 12, 17, etc., the line of male descent; circle 15 shows the third distinct strain of blood.

# APPENDIX B

## TABLE OF WEIGHTS AND MEASURES

### AVOIRDUPOIS WEIGHT.

16 drams = 1 ounce.
16 ounces = 1 pound.
14 pounds = 1 stone.
28 pounds = 1 quarter.
4 quarters = 1 hundredweight.
20 hundredweights = 1 ton.

### TROY WEIGHT.

24 grains = 1 pennyweight (dwt.).
20 pennyweights = 1 ounce.
12 ounces = 1 pound (Troy).

### LIQUID AND DRY MEASURE.

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon.
2 gallons = 1 peck.
4 pecks = 1 bushel.
3 bushels = 1 sack.
8 bushels = 1 quarter.

---

A bushel of Wheat weighs about 63 pounds.
,, Barley ,, ,, 52 ,,
,, Oats ,, ,, 40 ,,
,, Maize ,, ,, 60 ,,
,, Buckwheat ,, 52 ,,

# APPENDIX C

## RECIPES

### I. Ointment to keep Chickens free from Ticks, etc.

| | |
|---|---|
| Mercurial ointment | 1 ounce. |
| Lard | 1 ,, |
| Petroleum | 1 ,, |

Heat till semifluid; 1 drop to be applied with the head of a match. To be used with caution, mercury being dangerous in excess.

### II. Tonic for Turkey Chicks when "Shooting the Red."

| | |
|---|---|
| Powdered cassia bark | 3 ounces. |
| ,, ginger | 10 ounces. |
| ,, gentian | 1 ounce. |
| ,, aniseed | 1 ,, |
| Iron carbonate | 5 ounces. |

The tonic to be mixed with the meal at the rate of one teaspoonful per average brood of ten turkey chicks. To be given on wet days and as a preventive of diarrhœa.

### III. Cramp in Chickens.

One grain salicylate of soda to each chick, together with 2 grains Epsom salts.

### IV. Frost-Bitten Combs.

An ointment of—

| | |
|---|---|
| Lard | 2 ounces. |
| Quinine | 1 ounce. |
| Kerosene | 2 ounces. |

### V. Roup: A Dressing for Application to the Membranous Growths.

| | |
|---|---|
| Carbolic acid .. .. .. | 1 drachm. |
| Sulphurous acid solution .. .. | 3 drachms. |
| Tincture of perchloride of iron .. | 4 „ |
| Glycerine .. .. .. .. | 4 „ |

### VI. A good Parasiticide to be used in Treatment of Scaly Leg.

| | |
|---|---|
| Creosote .. .. .. .. | 1 part. |
| Camphor .. .. .. .. | 1 „ |
| Oil of turpentine .. .. .. | 7 parts. |
| Sweet oil .. .. .. .. | 3 „ |

### VII. For Use in Cases of Severe Diarrhœa and Dysentery.

| | |
|---|---|
| Rhubarb .. .. .. .. | 5 grains. |
| Chalk .. .. .. .. | 5 „ |
| Cayenne .. .. .. .. | 3 „ |

To be given as a pill twice daily.

### VIII. To Check Laying in Case of Egg-Binding.

| | |
|---|---|
| Calomel .. .. .. .. | 1 grain. |
| Tartar emetic .. .. .. | $\frac{1}{12}$ „ |

### IX. Catarrhal Roup.

Half a teaspoonful of Epsom salts, to be followed by a pill of—

| | |
|---|---|
| Balsam copaiba .. .. .. | 1 ounce. |
| Liquorice (powdered) .. .. | 4 drachms. |
| Piperine .. .. .. .. | 1 drachm. |

With sufficient magnesia to make into a mass.

# APPENDIX D

## AGE OF FARMERS' BIRDS

It must be apparent that if poultry are to have free run, some system of age record must be in operation. "Ringing" is not always possible in the case of a very large head of poultry, and something simpler is essential for the ordinary farmer. One such suggestion made to me by Mr. Leonard Crawshaw is to change the breed with the year. The colour would then indicate at a glance the age of the birds, and "three-year-olds" would advertise themselves and be easily weeded out. The system supposes that the farmer should not hatch any of his own eggs, but purchase or exchange the required sittings; thus there would be a three-year rotation of appropriate breeds. Such breeds might very well be, for example, White Wyandottes and White Leghorns for the first year, Brown Leghorns and Buff Orpingtons for the second year, and Anconas and Houdans or Houdan-Orpingtons for the third; or any other similar arrangement which suited the personal fancy of the farmer.

# INDEX

Accounts and profits, 177
American methods and English adaptation, 231
Artificial methods, 68
Assisted hatches, 46

Balance-sheet, 150
Best markets, 90
Birds on arable and pasture land, 192
Branches, 172
Breeding for egg production, 24
Breeding methods, 243
British Poultry Federation, Limited, 221
Brooding, 36

Capital, 161
Care and management of sitting hens, 38
Care of breeding stock, 20
Causes of disease, 114
Causes of failure, 137
Chicken-raising, 151
Choice of land, 164
City system, 235
Cold brooders, 75
Collecting depots, 223
Colony system, 189
Common ailments affecting chicken, 116
Corning houses, 238
Cramming, 103
Cross-breeding, 24

Daily round, 182
Day-old chicken trade, 152
"Dead in shell," 57
Definition of "poultry farming," 156
Development of embryo, 45
Diagnosis, 115
Disinfection, 114
Drawbacks and advantages for the farmer, 187
Duck fattening, 152
Ducks, geese, and turkeys, 199

Effects of foreign competition, 87
Egg preservation, 227
Egg records, 151
Egg yield, 248
Equipment of depots, 228

Farm methods of the past 185
Fatted fowls, 98
Fattening ducks, geese, and turkeys, 108
Feathering, 65
Feeding correctly, 13
Feeding of chickens, 245
Fireless brooders, 243
First meals, 62
Food bills, 169
Foreign competition, 205
Formation of local depots, 223
Fox question, 198

General management, 50
Grass run, 12

Housing and feeding, 142
Housing of stock, 6

Inbreeding, 23
Insect pests, 67
Irish organization, 209

Keeping the run sweet, 144

Laying competition, 27
Limitations of system, 242

Making the nest, 41
Management of brooders, 70
Management of stock ducks, geese, and turkeys, 33
Manuring the land, 191
Marketing, 107
Marketing points, 221
Merits in table fowls, 91
Milk chickens, 96
Modern combination of two methods, 36
Moisture, 54
Monthly notes for poultry-keepers, January to December, 249, 268

National Poultry Organization, 212
Natural and artificial incubation, 36
Natural methods, 60

Opportunity for the small poultry-keeper, 136

Partial *v.* total confinement, 240
Philo system, 232
Plant, 166
Precautionary measures, 114
Prices, 94
Profits of domestic poultry-keeping, 150
Purchasing poultry, 4

Qualification and training, 158

Rearing table chickens, 95

Secret of success, 241
Selecting a breed, 2
Selecting the best layers, 194
Separation of sexes, 75
Spring-chicken trade, 196
Stocking the farm, 170
Suitable breeds, 138
Suitable dietaries, 13
Sussex system, 101
Stubbles, 195

Table eggs and table fowls, 246
Testing for fertility, 44
Trap-nesting, 30

Useful crosses, 93

Various foods, 64
Various types of incubation, 47
Vices of fowls, 134

Winter eggs, 196
Women and poultry farming, 181

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